COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN II)
Northern and Central California, Nevada, and Utah
Contract Number N62474-94-D-7609
Contract Task Order 324

Prepared For

U.S. DEPARTMENT OF THE NAVY
Naval Facilities Engineering Command
Engineering Field Activities West
San Bruno, California

DRAFT FINAL
QUALITY ASSURANCE PROJECT PLAN
REMEDIAL INVESTIGATION FOR GROUNDWATER
SWMU SITES 1, 2, 5, 7, AND 18

NAVAL WEAPONS STATION,
SEAL BEACH DETACHMENT CONCORD
CONCORD, CALIFORNIA

January 23, 2001

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APPROVAL PAGE

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DEPARTMENT OF THE NAVY

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TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

APPENDICES

TABLES AND FIGURES

TABLE NO.

FIGURE NO.

ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or relevant and appropriate requirements
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-term Environmental Action Navy
CLP	Contract laboratory program
CoC	Chain-of-custody
CRDL	Contract-required detection limit
CRQL	Contract-required quantitation limit
CSM	Conceptual site model
CTO	Contract task order
DQO	Data quality objective
EDD	Electronic data deliverable
EFA West	Naval Facilities Engineering Command Engineering Field Activities West
EPA	U.S. Environmental Protection Agency
FSP	Field sampling plan
FTL	Field team leader
GC/MS	Gas chromatography/mass spectrometry
IR	Installation Restoration
LCS	Laboratory control sample
LFR	LFR Levine·Fricke
MCL	Maximum contaminant level
µg/L	Micrograms per liter
µg/kg	Micrograms per kilogram
mg/L	Milligrams per liter
MS	Matrix spike
MSD	Matrix spike duplicate
Navy	U.S. Department of the Navy
NAWQC	National Ambient Water Quality Criteria
NFESC	Naval Facilities Engineering Support Center
NEX	Naval Exchange
NWSSBD	Naval Weapons Station, Seal Beach Detachment Concord
PARCC	Precision, accuracy, representativeness, comparability, and completeness
PE	Performance evaluation
PRG	Preliminary remediation goals
PVC	Polyvinyl chloride
QA	Quality assurance
QAO	Quality assurance officer
QAPP	Quality assurance project plan
QC	Quality control
QCSR	Quality control summary report

ACRONYMS AND ABBREVIATIONS (Continued)

RI	Remedial investigation
RWQCB	Regional Water Quality Control Board
SDG	Sample delivery group
SEA	Site evaluation accomplished
SOP	Standard operating procedure
SOW	Statement of work
SWDIV	Naval Facilities Engineering Command Southwest Division
SWMU	Solid waste management unit
TCL	Target compound list
TIC	Tentatively identified compound
TtEMI	Tetra Tech EM Inc.
VOC	Volatile organic compound

1.0 INTRODUCTION

The U.S. Department of the Navy (Navy), Engineering Field Activities West (EFA West), Naval Facilities Engineering Command, is conducting a remedial investigation for groundwater in the area of solid waste management unit (SWMU) Sites 1, 2, 5, 7, and 18 at Naval Weapons Station, Seal Beach Detachment Concord (NWSSBD), in Concord, California. The Navy has authorized Tetra Tech EM Inc. (TtEMI) to conduct the remedial investigation for groundwater under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract No. N62474-94-D-7609, Contract Task Order (CTO) No. 324. TtEMI's CLEAN team subcontractor, LFR Levine·Fricke (LFR), prepared this quality assurance project plan (QAPP) in partial fulfillment of CTO No. 324.

This QAPP has been prepared in support of the investigation to evaluate the potential presence of volatile organic compounds (VOC) detected in groundwater at SWMUs 1, 2, 5, 7, and 18 as described in the accompanying field sampling plan (FSP) (TtEMI 2000). This QAPP documents policies, project organization, and quality assurance (QA) and quality control (QC) to be implemented for field activities in support of the remedial investigation (RI) for groundwater as described in the FSP (TtEMI 2000). The U.S. Environmental Protection Agency (EPA) requires an EPA-approved QAPP for every monitoring and measurement project mandated or supported by EPA. This document has been developed in accordance with EPA guidelines for preparation of QAPPs (EPA 1999a) and with related environmental work instructions from Naval Facilities Engineering Command Southwest Division (SWDIV) (SWDIV 1999a, 1999b, and 1999c).

This QAPP was prepared in support of the activities described in the statement of work (SOW) for CTO 324 from EFA West dated December 8, 1999. The SOW was issued to adequately define the nature and extent of VOCs in groundwater at the SWMU sites, investigate potential sources of the VOCs, and adequately define the nature and extent of VOC-affected soil, if encountered.

The FSP describes the locations, analyses, and field procedures to be followed during groundwater and soil sampling, water level measurements, and surveying. This QAPP presents the QC procedures to be implemented for this investigation as follows:

Section 2.0: Overall project organization

Section 3.0: Quality assurance objectives

Section 4.0: Sample custody and documentation procedures

Section 5.0: Quality assurance procedures

Section 6.0: Data quality management requirements

Section 7.0: Quality assurance oversight

Section 8.0: References

Fieldwork for this investigation is tentatively scheduled for spring 2001.

1.1 PURPOSE

The purpose of the field work is to adequately define the nature and extent of VOCs consistently detected above screening criteria in groundwater monitoring wells at SWMUs 1, 2, 5, 7, and 18, investigate the source of the VOCs, and adequately define the nature and extent of VOC-affected soil, if encountered. The site background, including operational history, previous investigation results, and site geology and hydrogeology, is presented in Section 2.0 of the FSP (TtEMI 2000).

As described in Section 3.0 and shown in Figure 2-5 of the FSP (TtEMI 2000), 31 initial soil borings for groundwater sampling will be judgmentally placed across the site and upgradient of the site to investigate potential sources and adequately define the nature and extent of VOC contaminants. Step out borings, if needed, will be judgmentally placed based on initial groundwater analytical results. Step out criteria is presented in Section 3.1.5 of this report. Soil borings are proposed for follow-up soil source sampling and will be located based on the results of the initial groundwater sampling. Four discrete soil samples will be collected from each soil boring at 2, 6, 10, and 14 feet below ground surface (bgs). If VOC-affected soil is encountered and step out samples are necessary to adequately delineate affected soil, step out borings will be judgmentally placed based on initial soil analytical results.

Groundwater samples will be collected in certified clean containers of appropriate size, and Encore™ samplers will be used to collect soil samples. Samples will be submitted to a subcontract laboratory for analysis using EPA-approved methodologies. Industry-standard sample custody procedures will be used to maintain and document sample integrity during collection, transportation, storage, and analysis.

The sampling methods are described in Section 4.0 of the FSP. The analytical program is presented in Table 1.

1.2 QUALITY ASSURANCE PROJECT PLAN ELEMENTS

EPA guidelines state that QAPPs (1) evaluate the data quality objectives (DQO) for the project, (2) ensure that intended measurements and data to be acquired are appropriate, (3) ensure that QA/QC procedures are adequate for confirming data quality, and (4) identify limitations regarding the use of the data. The following table provides a summary of the QAPP elements (EPA 1999a).

EPA Guidance Section	Element/Content	Report Section
A	**Project Management**	
A1	Title and approval sheet	Cover pages
A2	Table of contents	Pages i - iii
A3	Distribution list	Cover letter
A4	Project/task organization	2.0
A5	Problem definition/background	1.1
A6	Project/task description	1.1
A7	Quality objectives and criteria for measuring data	3.0
A8	Special training and certification	2.0
A9	Documentation and records	6.0
B	**Measurement/Data Acquisition**	
B1	Sampling process design (experimental design)	3.1.7
B2	Sampling methods	3.1.7
B3	Sample handling and custody	4.0
B4	Analytical methods	3.2
B5	Quality control	5.0
B6	Instrument/equipment testing, inspection, and maintenance	5.3
B7	Instrument calibration and frequency	5.4
B8	Inspection/acceptance of supplies and consumables	5.3
B9	Non-direct measurements	6.0, 7.1
B10	Data management	6.0
C	**Assessment/Oversight**	
C1	Assessments and response actions	7.1, 7.2
C2	Reports to management	7.3
D	**Data validation and usability**	
D1	Data review, validation, and verification	6.1, 6.2, 6.3
D2	Validation and verification methods	6.2, 6.3
D3	Reconciliation with user requirements	3.1.5

1.3 DATA USAGE

The data gathering and decision-making steps for this project are based on the following data usage:

- The VOC data from groundwater samples will be compared to the California-enforced maximum contaminant level (MCL) (Regional Water Quality Control Board [RWQCB] 2000) and RWQCB Basin Plan Requirements (RWQCB 1995) and will be used to determine the nature and extent of VOCs in groundwater.
- The VOC data from soil samples will be compared against EPA Region IX residential preliminary remediation goals (PRG) (EPA 1999b) and will be used to determine the nature and extent of VOCs in soil.

The results of these field activities will be presented in a follow-up RI report for SWMUS 1, 2, 5, 7, and 18.

2.0 PROJECT ORGANIZATION

This section discusses management of the project. A well-organized project team combined with adequate experience and proper training will ensure consistent quality throughout the field investigations at NWSSBD. All LFR and TtEMI personnel working on hazardous-waste project sites, who are responsible for the project or site activities, are required to undergo specific training before participating in, managing, or supervising field activities. LFR and TtEMI personnel who engage in activities that potentially expose workers to hazardous substances and health hazards at a hazardous-waste site will receive a minimum of 40 hours of formal instruction off site compliant with a minimum of 3 days of field experience on site under the supervision of a trained, experienced field supervisor.

The following personnel are involved in supervision of the sampling and analysis program at NWSSBD. In some cases, more than one responsibility has been assigned to a given person.

Name	Responsibility	Location	Telephone
Gilbert A. Rivera	Navy Remedial Project Manager	EFA West - San Bruno, CA	(650) 244-2565
Narciso A. Ancog	Navy QA Officer	SWDIV - San Diego, CA	(619) 532-2540
Daniel Chow	Program Manager	TtEMI - San Francisco, CA	(415) 222-8222
Greg Swanson	QA Program Manager	TtEMI - San Diego, CA	(619) 718-9676
John Bosche	Installation Coordinator and Project Manager	TtEMI - San Francisco, CA	(415) 222-8295

Name	Responsibility	Location	Telephone
Ron Ohta	Project QA Manager	TtEMI - Sacramento, CA	(916) 853-4506
Conrad Sherman	Program Health and Safety Manager	TtEMI - San Francisco, CA	(415) 222-8377
Don McHugh	Project Health and Safety Coordinator	TtEMI - San Diego, CA	(619) 718-9676
Kevin Hoch	Analytical Coordinator	TtEMI - San Francisco, CA	(415) 222-8304
Brian Keating	Field Team Leader and On-site Safety Officer	LFR - Emeryville, CA	(510) 596-9601
Wing Tse	Database Manager	TtEMI - San Francisco, CA	(415) 222-8326

The roles and key responsibilities of each project team member are described below, and an organization flow chart is included as Figure 1.

Navy Remedial Project Manager

The Navy remedial project manager (RPM) has overall responsibility for the Installation Restoration Program (IRP). The Navy RPM is directly responsible for project execution and coordination with base representatives, regulatory agencies, and the SWDIV management team.

The Navy RPM is responsible for the following:

- Providing site information and history
- Providing logistical assistance
- Specifying sites that require investigation
- Reviewing results and recommendations and providing management and technical oversight
- Verifying proper review and distribution of documents
- Communicating comments from technical reviewers to contractors
- Verifying that contractors address comments and take appropriate corrective actions
- Coordinating with regulatory agencies

Navy Quality Assurance Officer

The Navy Quality Assurance Officer (QAO) is responsible for QA issues for all Navy CLEAN II work. The Navy QAO provides government oversight of the QA program, including review and sign-off on QAPPs and FSPs. The QAO provides quality-related direction through the contracting officer's technical representative to the quality manager. The QAO has authority to suspend affected project or site activities if SWDIV-approved quality requirements are not adequately met.

Program Manager

The TtEMI Navy CLEAN II program manager is responsible for and has authority over all work by TtEMI and subcontractor personnel assigned to the Navy CLEAN II program. The program manager establishes program policies and procedures, monitors costs and performance, delegate's authority, and resolves conflicts and problems. The TtEMI program manager is responsible for the following:

- Verifying that contract requirements are met
- Providing necessary resources to the project team to allow adequate response to the requirements of the investigation
- Maintaining consistency in procedures and work products with other task orders
- Establishing and maintaining communication among the RPM, QA manager, health and safety program manager, and project managers
- Providing technical oversight and review of the final project report
- Providing guidance to the project manager
- Assisting the CLEAN II program QA manager in resolving QA issues that cannot be handled at the CTO project manager or quality control coordinator (QCC) level
- Assisting the CLEAN II program QA manager in resolving issues with subcontractors
- Monitoring compliance of CTO project managers with orders and recommendations
- Establishing and supporting continuous quality improvement (CQI) problem-solving teams and process improvement groups to follow through with program-specific quality and process improvement opportunities identified by the CLEAN II program QA manager and QC coordinator
- Providing TtEMI CTO project managers with revised standard operating procedures (SOP) received from the CLEAN II program QA manager and ensuring that these improved SOPs are followed

Program QA Manager

The program QA manager is responsible for the quality of all work completed by TtEMI and its subcontractors under the Navy CLEAN II program. The program QA manager develops and maintains a comprehensive QA program and is responsible for audits, reviews of all work performed, and recommendations to technical staff and management regarding quality. The program QA manager has the following specific responsibilities:

- Developing and revising the TtEMI Navy CLEAN II QA program
- Assigning qualified personnel to serve as project QA managers

- Implementing and supervising the QA program with the assistance of QCCs and subcontractor project QA managers
- Coordinating and auditing the review of QC documentation and technical operations, as required
- Identifying nonconformance situations to the CLEAN II program manager and TtEMI corporate QA manager
- Providing guidance to CTO technical staff for QC program development and correcting nonconformance situations
- Preparing, revising, and providing SOPs to CTO project managers and technical staff
- Interacting with the Navy QAO about certification of laboratories and coordinating QA and technical staff compliance with requirements
- Ensuring compliance with orders and making recommendations to the CLEAN II program manager and CTO project managers regarding corrective action
- Approving the waiver of requirements for a written QC procedure when SOPs are specified by the Navy and are available for use
- Communicating regularly with the CLEAN II program manager and providing a summary of quality improvement opportunities to the CLEAN II program manager for further action
- Communicating regularly with and supervising QA responsibilities of QC coordinators and coordinating and CQI opportunities identified by QCCs
- Updating the TtEMI corporate QA manager on newly identified, ongoing, and completed program-specific quality improvement opportunities
- Communicating TtEMI-identified quality improvement opportunities to subcontractor QA managers and assisting subcontractor QA managers in pursuing quality improvement opportunities that will benefit the overall program QA effort
- Meeting regularly with the program managers, project managers, and QA managers
- Reviewing and approving the QAPP
- Conducting field audits to ensure that sampling is performed in accordance with the QAPP

The program QA manager reports, as necessary, to the corporate QA manager and consults frequently with the program manager and the project QA manager. The program QA manager refers QA issues or disputes that cannot be resolved within the Navy CLEAN II program to the TtEMI corporate QA manager.

Installation Coordinator

The TtEMI installation coordinator (IC) has overall responsibility for all TtEMI activities at NWSSBD. These activities are divided into CTOs. The IC is responsible for overseeing all project activities and

coordinating with subcontractors.

Project Manager

The project manager will work closely with the IC. The project manager is responsible for overseeing project activities and coordinating with subcontractors. The project manager is ultimately responsible for timely completion of the project.

The responsibilities of the project manager are as follows:

- Verifying that QC requirements are fulfilled by team members
- Supervising the document control process
- Approving deliverables and associated documents before they are transmitted
- Establishing and maintaining communication among technical staff, program managers, QA officers, health and safety coordinators, and regulatory agencies
- Implementing programs and protocols related to the project
- Developing work plans that define the scope of major activities at the level of defensibility, documentation, and QC required for environmental measurements
- Developing specific QC procedures for major activities that produce or use environmental data
- Defining, reporting, and maintaining documentation of the precision, accuracy, representativeness, comparability, and completeness (PARCC) of data
- Working with program management, QC coordinators, and other CTO project managers to develop, revise, and implement mechanisms, as needed, to identify QA problems and expedite corrective actions
- Verifying that data processing procedures are documented, routinely reviewed, and revised
- Verifying that the CTO project team fulfills QC requirements of the work plan
- Maintaining and regularly reviewing QA records and forwarding copies to the QC coordinators and CLEAN II program QA manager
- Overseeing the technical review and QC check for deliverables and approving data, reports, specifications, drawings, and documentation before they are transmitted
- Establishing and maintaining communication among the CTO technical staff, the TtEMI QC coordinators, and CLEAN II program QA manager
- Preparing QAPPs for any CTO involving field data collection activities, such as sample collection, including specifying acceptance criteria for the quality of data
- Verifying by personal observation that appropriate sampling, field testing, and field analysis procedures, as specified in the work plan and QAPP, are followed and that correct QC checks are made

- Working with QC coordinators to implement quality improvements identified during audit and review of ongoing work
- Implementing and following approved SOPs received from the TtEMI program manager
- Controlling the identification and handling of all documentation until it is turned over to designated document-control personnel

Project QA Manager

A senior technical staff member will serve as project QA manager and will be responsible for review of work completed by TtEMI. The manager will provide recommendations about quality to the project manager and technical staff. The project QA manager will also regularly communicate with the CLEAN II program QA manager to discuss QA problems and resolutions. The specific responsibilities of project QA manager are the following:

- Meeting regularly with the CLEAN II program QA manager
- Reviewing all deliverables before they are released to ensure conformance with QA/QC procedures and the quality of the work product
- Providing recommendations to the program QA manager, as required, for corrective action regarding all aspects of work that do not meet program standards
- Providing guidance to project teams for QC program development and for correcting nonconformance situations
- Coordinating QC and technical staff compliance with specific QC requirements
- Ensuring compliance with orders and making recommendations to CTO project managers regarding corrective action
- Identifying quality improvement opportunities as part of the audit and review function
- Communicating quality improvement opportunities to the program QA manager or CTO project managers as appropriate
- Ensuring that the QAPP is prepared in accordance with EPA guidance documents
- Ensuring that all protocols described in the QAPP are met
- Providing guidance or assistance in resolving problems on QA/QC topics
- Verifying that the specified data collection methods comply with QA/QC requirements and will yield data of the desired quality and integrity
- Reviewing, evaluating, and approving quality-related changes to the FSP and project work plan
- Ensuring that all nonconformances are identified and appropriate corrective actions are taken, providing assistance to the project managers with regard to corrective action, and, if necessary, soliciting involvement by the program manager and program QA manager

- Conducting laboratory evaluations and audits to ensure that analyses are performed in accordance with the QAPP
- Communicating regularly with the project manager, program QA manager, and project chemist to ensure the progress of QA tasks for the project
- Serving as the main contact for project QA matters and providing guidance on appropriate procedures to the project managers and support personnel

Program Health and Safety Manager

The program health and safety manager (HSM) is responsible for developing health and safety standards, implementing health and safety policies, and providing consultation to management for the Navy CLEAN program. The specific responsibilities of the HSM are the following:

- Keeping management informed regarding the status of the Navy CLEAN II health and safety program
- Providing consultation on health and safety policy and procedural issues
- Participating in audits to evaluate compliance with the HSP and the Navy CLEAN II health and safety program
- Reviewing the HSP for technical content and compliance with the requirements of the Navy CLEAN II health and safety program
- Developing, implementing, and assessing the needs of the Navy CLEAN II health and safety program and informing the project health and safety coordinators of changes that occur in this program
- Providing consultation on health and safety policy and procedural issues as they relate to the Navy CLEAN II health and safety program

Project Health and Safety Manager

The project health and safety manager is responsible for developing, instituting, coordinating, and supervising the health and safety program. The project health and safety coordinator's responsibilities are the following:

- Overseeing the preparation of the HSP
- Providing assistance to the program HSM for health and safety program development, preparing training sessions, conducting accident investigations, and providing recommendations to prevent future accidents
- Ensuring that the HSP complies with federal, state, and local health requirements
- Coordinating with the on-site safety officers on modifications to the HSP and providing consultation, when required

- Preparing materials to be used in the training program and ensuring that the TtEMI on-site safety officer is knowledgeable in requirements of the HSP
- Conducting periodic site visits to verify that site personnel adhere to safety requirements
- Establishing and maintaining communication among the on-site safety officer, project manager, and the CLEAN II program HSM
- Providing guidance on appropriate corrective action procedures to the project manager and support personnel

Analytical Coordinator

The analytical coordinator works with the task manager during preparation of the FSP and QAPP. These tasks include coordinating the analytical tests consistent with the type and quality of analytical data required for the project, setting up the contract analytical laboratories, coordinating validation of analytical results, and providing the procurement office with the information required to procure any special analysis. The responsibilities of the analytical coordinator are the following:

- Verifying that the laboratory implements the requirements of the FSP and QAPP
- Coordinating with the contract laboratory on pickup and delivery schedules and QA/QC matters
- Conducting laboratory evaluations and audits
- Reviewing laboratory data prior to release
- Coordinating data validation activities
- Providing updates on the project to project QA officers and managers with regard to the QA/QC data

Field Team Leader

The field team leader will work closely with the project manager. The field project manager is responsible for overseeing field activities.

The responsibilities of the field team leader are as follows:

- Verifying that field QC requirements are fulfilled by team members
- Maintaining communication among technical staff, program managers, QA officers, health and safety coordinators, and regulatory agencies
- Implementing programs and protocols related to the field effort
- Verifying that the field team fulfills QC requirements of the FSP

- Maintaining and regularly reviewing QA records and forwarding copies to the project manager
- Verifying by personal observation that appropriate sampling, field testing, and field analysis procedures, as specified in the FSP and QAPP, are followed and that correct QC checks are made
- Implementing and following approved SOPs received from the TtEMI project manager
- Controlling the identification and handling of all documentation until it is turned over to the project manager

On-Site Safety Officer

The on-site safety officer is responsible for field implementation of the HSP and has the authority to correct and change site control measures and the required health and safety protection. The on-site safety officer has primary on-site enforcement authority, as delegated by the project manager, for the policies and provisions of the health and safety program and the HSP. Responsibilities of the on-site safety officer are as follows:

- Serving as the initial contact for site-specific health and safety activities
- Conducting briefing sessions for and providing documentation to site personnel concerning site-specific hazards, emergency procedures, and symptoms associated with exposure to specific site contaminants
- Documenting health and safety briefings, meetings, and training that were completed in the field
- Selecting the required personal level of protection based on guidance in the facility-wide HSP and based on actual on-site operations
- Establishing, enforcing, and documenting decontamination operations for personnel and sampling equipment, sample containers, and heavy equipment
- Suspending any operation that threatens the health or safety of team members or the surrounding population and immediately notifying the project manager
- Determining and posting locations and routes to medical facilities, arranging for emergency transportation to medical facilities, and posting emergency service telephone numbers
- Assuming the lead role for during medical emergency

Database Manager

The database manager coordinates loading and checking data in the database. The TtEMI database manager is also responsible for interacting with the project chemist during preparation of the FSP and QAPP to address sample identification issues. In addition, the database manager is responsible for working with the project chemist and the field team leader to prepare for the field sampling effort. The

project database manager is responsible for all aspects of developing and monitoring the database under the guidance of the project manager, as follows:

- Designing the database
- Selecting software
- Coordinating with data submitters
- Logging and transferring data
- Entering and verifying data
- Developing screen and report format
- Archiving data
- Assisting users in accessing and retrieving data
- Documenting the database
- Distributing the database
- Verifying software verification and change approvals
- Verifying and documenting all changes to the existing data

3.0 QUALITY ASSURANCE OBJECTIVES

The following sections present the DQOs as well as analytical methods and reporting limits for this project.

3.1 DATA QUALITY OBJECTIVES

DQOs are qualitative and quantitative statements developed through a seven-step process (EPA 1994a). The DQOs clarify the study objective, define the most appropriate type and conditions of data collection, and specify tolerable limits on decision errors that will be used as the basis for establishing the quantity and quality of data needed to support decision making. The DQOs are used to develop a scientific and resource-effective design for data collection. Guidance for the preparation of DQOs is provided in EPA documents "Guidance for the Data Quality Objectives Process," QA/G-4; "Data Quality Objectives Decision Error Feasibility Trials," QA-G4D; and "Data Quality Objectives Process for Hazardous Waste Site Investigations," Peer Review Draft, EPA QA/G-4HW (EPA 1994a 1994b, 1999c). The EPA guidance (EPA 1994b, 1999c) presents the DQOs as a seven-step process:

- **Step 1 – State the Problem**. Summarize issues that require environmental data and identify resources available to resolve the problem.

- **Step 2 – Identify the Decision**. Identify what questions the study will attempt to resolve, and what actions may result.
- **Step 3 – Identify Inputs to the Decision.** Identify the information needed to support the decision and specify which inputs require new environmental measurements.
- **Step 4 – Define the Study Boundaries.** Specify the spatial and temporal aspects of the environmental media that the data must represent to support the decision.
- **Step 5 – Develop a Decision Rule.** Develop a logical "if...then" statement that defines the conditions that would cause the decision-maker to choose among alternative actions.
- **Step 6 – Specify the Limits on Decision Errors**. Specify the decision-maker's acceptable limits on decision errors, which are used to establish performance goals for limiting uncertainty in the data.
- **Step 7 – Optimize the Design for Obtaining Data.** Identify the most resource-effective sampling and analysis design for gathering data that are expected to satisfy the DQOs.

Project-specific descriptions for the seven steps are summarized in Table 2. Guidance for preparation of DQOs according to a seven-step process is provided in EPA guidance documents (EPA 1994a).

3.1.1 Step 1 - State the Problem

The purpose of this step is to describe the problem, and detail the available resources and relevant deadline for the study. The information collected for this step should provide a solid foundation upon which the remainder of the DQO process will be built. The necessary information includes the following: developing the conceptual site model (CSM), defining the exposure pathways and exposure scenarios, and specifying the available resources upon which the remaining DQO process will be built. This section will present the information collected for this step of the DQO process, as relevant to this investigation.

The storage, use, and release of VOCs have been investigated and documented based on the historical uses and operations performed at the site. The previous investigations performed have resulted in the identification of VOC-affected groundwater at the site, however, the nature and extent, as well as potential sources, have not been adequately characterized. The following areas of SWMUs 1, 2, 5, 7, and 18 were identified as requiring further investigation:

- The source of low level PCE detected in SWMU 1 monitoring wells has not been identified and may be associated with an upgradient off-site source.

- The source of TCE in SWMU 2 monitoring well MW-11 has not been identified and may be associated with an upgradient off-site source.
- The source and extent of VOC-affected groundwater has not been adequately defined in the vicinity of MW-10 at SWMU 5.
- The source of low level VOCs detected in groundwater at SWMU 7 and methyl tertiary-butyl ether (MTBE) detected in monitoring well MWIA-17 has not been identified and may be associated with an upgradient off-site source.
- The source of TCE was detected in monitoring wells MW-07, MW-08, MW-12, and MW-13 in SWMU 18 has not been identified and may be related to an upgradient off-site source.

Routes of contaminant migration reflect the fact that the observed VOCs have a wide range of characteristics, including their mobility in environmental media and their susceptibility to degradation and detoxification. VOCs have moderately high water solubility, low viscosity, and high volatility, and can move readily through soil and groundwater (both as dissolved and free-phase constituents). VOCs can volatilize to the air or migrate with the groundwater where they may eventually be discharged to Suisun Bay.

Human and aquatic organisms have been identified as potential receptors at the site. VOCs have acute, chronic, and carcinogenic human health effects and can be toxic. The potential human exposure primarily depends on the reuse of the specific site. Residential and industrial occupants and construction workers have been identified as potential human receptors at the site. Exposure could result from contact with contaminated surface or subsurface soil, airborne particles, or volatilized constituents.

Once the QAPP and the FSP are approved, the delineation of VOCs at the site is tentatively scheduled for completion by the end of summer 2001. This schedule includes two rounds of groundwater sampling, two rounds of soil sampling, sample analysis, and data validation.

3.1.2 Step 2 – Identify the Decision

The supplementary decisions to be made for the study site are as follows:

- Is the extent of VOC-affected groundwater adequately defined by samples with non-detects or detected concentrations below screening criteria?
- Do VOC-affected soils exist at concentrations above screening criteria in vadose zone soils overlying the area of VOC-affected groundwater?

- If VOC-affected soil is encountered above screening criteria, is the nature and extent adequately defined by samples with detected concentrations below screening criteria?
- What is the source of VOC-affected groundwater and soil?

3.1.3 Step 3 – Identify Inputs to the Decision

The inputs to the decision are from the following sources:

- Validated defensible chemical data for soil and groundwater samples
- Existing well elevation data and groundwater level measurements adequate to construct a groundwater contour map of the study area
- Reviews of historical operations at the site with NWSSBD staff
- Validated VOC analytical results from previous investigations and quarterly monitoring well sampling events adjacent to the study area
- EPA Region IX Residential PRG screening criteria for VOCs in soil (EPA 1999b)
- RWQCB Basin Plan guidelines (RWQCB 1995) and federal and state MCLs (RWQCB 2000) for groundwater quality
- Proposed future uses for the sites

3.1.4 Step 4 – Define the Study Boundaries

The spatial boundaries of the study area are the SWMUs 1, 2, 5, 7, and 18 general site limits and the area approximately 300 feet upgradient of SWMUs 5 and 18. Extensive sampling conducted at this site in the past has helped to focus the locations where additional groundwater and soil characterization sampling should be performed. The vertical study boundary is defined as 0 to approximately 25 feet bgs.

The temporal boundaries extend from the time of the first release through the historical investigations conducted, and end with a documentation and summary of conditions as well as a determination from the agencies and the Navy for additional FS studies under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) process or a determination of site evaluation accomplished (SEA).

3.1.5 Step 5 – Develop a Decision Rule

The decision rule is an "if...then" statement that defines the conditions that will cause the decision-maker to choose among alternative actions. For this investigation, the following decision rules will be applied to assess whether additional field investigation activities are required:

- If the VOC-affected groundwater is not adequately defined (results greater than MCL or RWQCB screening criteria), then step out samples will be collected until results fall below screening criteria.
- If the area of VOC-affected groundwater is adequately defined (results less than MCL and RWQCB screening criteria), then follow-up soil source sampling will be conducted from soils overlying the affected groundwater area.
- If VOC-affected soil is encountered and the area of affected soil are not adequately defined (results greater than EPA residential PRG screening criteria), then additional step out soil samples will be collected until results fall below EPA PRG screening criteria.
- If elevated VOC concentrations in soil are found in overlying areas of affected groundwater, then the soil in the area is a potential source to groundwater.

3.1.6 Step 6 – Specify Limits on Decision Errors

The objective of the data collection effort specified in the FSP (TtEMI 2000) is to confirm the presence, levels, extent, and potential sources of VOCs in groundwater at SWMUs 1, 2, 5, 7, and 18. The data collection locations are based on professional judgement; therefore, a statistical model is not appropriate. Measurement quality objectives, in the form of precision and accuracy goals, are designed to minimize analytical errors.

3.1.7 Step 7 – Optimize the Design for Obtaining Data

The goal of this step is to identify a resource-effective sampling design for generating environmental data that will satisfy the DQOs. The design allows for additional step out sampling where necessary after evaluation of the initial round of data collected, and comparison to screening criteria. The source of VOC contaminants is not known, therefore, the likelihood of required step out sampling is considered moderate, and will be fully evaluated based on the decision rule outlined in Step 5 of the DQO process.

Because of the number and locations of previous soil and groundwater samples collected at this site, the program design includes a sampling approach that attempts to further define the extent of VOCs and

potential sources. The sample design uses a nonrandom, judgmental sampling approach and is based on professional knowledge of site specific hydrogeological conditions and a review of site specific historical and base operations information, the results of previous investigation activities, and various regulatory guidance documents. Should step out sampling be recommended, a site specific sampling design will be prepared by the Navy and will be presented for agency review in a FSP addendum letter before the additional field work is conducted. Information to be included in the FSP addendum is described in Section 3.0 of the FSP. Sampling method information (i.e., field procedures for collecting samples and decontamination of sampling equipment) is described in Section 4.0 of the FSP. Sample handling information is described in Section 5.0 of the FSP.

The 31 initial borings for groundwater sampling will be placed in the locations shown on Figure 2-5 of the FSP and are based on past historical operations and potential upgradient sources, results of previous groundwater sampling data, available groundwater gradient information, and professional judgement of hydrogeologic conditions at the SMWU sites. They are designed to adequately evaluate the nature and extent of VOCs in groundwater in the SWMU sites and upgradient of the SWMU sites. The 31 borings include locations immediately adjacent to potentially suspect historical surface cleaning, degreasing, and container storage operations occurring at SWMUs 1, 2, 5, 7, and 18. Step out borings, if needed, will be placed based on initial groundwater analytical results. All groundwater samples will be collected using a screen points sampler. The locations of soil borings proposed for soil source sampling will be based on the results of groundwater sampling. Four discrete soil samples will be collected from each boring at 2, 6, 10, and 14 feet bgs using soil sample probes. If VOC-affected soil is encountered and step out samples are needed to adequately delineate affected soil, the step out borings will be located based on professional judgement and initial soil analytical results.

3.2 ANALYTICAL METHODS AND REPORTING LIMITS

Soil and groundwater samples collected for this groundwater investigation at NWSSBD will be analyzed for VOCs alone. Analytical methods that will be used are presented in Table 3. Samples will be submitted to a subcontracted laboratory for analysis using Contract Laboratory Program (CLP). Low lab detections will be requested because the selected screening criteria are low. Examples of forms used in sample collection and analysis are presented in Appendix A.

VOCs, both halogenated and non-halogenated, will be quantified in water and soil samples to evaluate VOC concentrations. The methods detailed in the CLP SOW for VOCs will be performed on soil and

water samples. CLP contract-required quantitation limits for TCL VOCs are listed in Table 4. If one of the initial calibration standards is not at the required quantitation limit, a quantitation limit standard at that level will be required to verify instrument sensitivity and linearity. When required, the quantitation limit standard will be analyzed daily after the calibration standards. Compounds detected in the quantitation limit standard will be within 25 percent of the true value. The CLP VOC is a purge-and-trap gas chromatography and mass spectrometry (GC/MS) method applicable to the determination of purgeable organics in solid or aqueous samples. An inert gas is bubbled through a specially designed purging chamber at 40°C for soil and at ambient temperatures for the water samples. The GC instrument is temperature programmed to separate the purgeables, which are then detected by the mass spectrometer.

The target compound list (TCL) compounds are identified by mass spectra and retention time. The TCL will be quantified in water and soil samples. In addition to the TCL, a library search will be performed to identify the 10 highest concentration non-target compounds in each sample. These non-target compounds are commonly known as tentatively identified compounds (TIC). QC samples and procedures are discussed in Section 5.0 of this QAPP, and precision and accuracy goals are shown in Table 5.

4.0 SAMPLE CUSTODY AND DOCUMENTATION PROCEDURES

The following section describes sample custody procedures and field logbook documentation to be followed during fieldwork at NWSSBD.

Chain-of-custody (CoC) procedures provide an accurate written record that traces the possession of individual samples from the time of collection in the field to the time of acceptance at the laboratory. Industry-standard sample custody procedures will be used to maintain and document sample integrity during collection, transportation, storage, and analysis. The appendix to this QAPP provides an example of a CoC record used by TtEMI. The field team leaders are responsible for proper sample handling and documentation so that the possession and handling of individual samples can be traced from the time of collection to laboratory receipt. The field team leaders are also responsible for proper documentation on the CoC, which identifies the samples to be used for QC purposes. The laboratory QA manager is responsible for establishing a sample control system that will allow sample possession to be traced from laboratory receipt to final sample disposition.

Field activities at NWSSBD will use extended CoC forms, lithologic log forms, water-quality sampling information forms, and water-level measurement forms, as appropriate. These forms are included in Appendix A of this QAPP and will be used as source documents in support of the NWSSBD database. Industry-standard field documentation procedures will be used to maintain an accurate account of field activities.

Each sample will be collected in an appropriately sized, certified clean container supplied by the laboratory or received directly from the manufacturer. A sample label will be affixed to individual Encore™ zipper bags that contain the Encore™ sampler and all groundwater sample containers sent to the laboratory. An example of the sample label is included in Appendix A. This identification label will be written in indelible ink and will include the project name and location, sample location, sample identification number, date and time of sample collection, any preservative used, the sampler's name and initials, any filtering performed, the type of sample, and the required analysis. The sample identification number for each sample will be generated in accordance with the sample numbering system described in Section 5.1 of the FSP. After labeling, each sample will be refrigerated or placed in a cooler maintained at a temperature of 4° C (+/-2°C). Table 6 shows required containers, preservation, and holding times for each sample.

U.S. Department of Transportation regulations will be followed during sample packaging and shipment. Samples collected during the field effort must be identified as environmental samples. Following sample collection, custody seals will be used on each transport container to ensure that no tampering occurs. Custody seals will consist of security tape with the date and initials of the sampler or field team leader. The tape will be placed such that the seal must be broken to gain access to the contents.

5.0 QUALITY ASSURANCE PROCEDURES

The main goal of any sampling and analysis program is to obtain accurate, representative environmental samples and to provide valid analytical data. A program to evaluate field and laboratory data and laboratory supplies was developed to achieve these goals. Additionally, a program to inspect and calibrate field equipment was developed to ensure that appropriate samples are collected. Quality of the field data will be assessed through the collection and analysis of field QC samples on a regularly scheduled basis. Laboratory QC samples will also be analyzed in accordance with referenced analytical

method protocols to ensure that laboratory procedures and analyses are conducted properly. Quality of laboratory supplies is assured by inspection of supplies and consumables.

For valid analytical data, all analytical results will be assessed according to the PARCC parameters described below.

Precision

Precision is the degree of mutual agreement between individual measurements of the same property under prescribed similar conditions. Data precision is evaluated by calculating the relative percent difference (RPD) from field and laboratory duplicate results. The RPD is calculated using the following formula:

$$RPD = \frac{|A - B|}{(A+B)/2} \times 100$$

where:

A = First duplicate concentration

B = Second duplicate concentration

Accuracy

Accuracy is the degree of agreement between an analytical measurement and a reference accepted as a true value. Sampling accuracy will be evaluated based on the results of the analysis of field blanks, trip blanks, and source-water blanks. The analytical laboratory will conduct a program of sample spiking to evaluate laboratory accuracy. This program includes analysis of the MS and MSD samples, laboratory control spikes (LCS) or blank spikes, surrogate standards, internal standards, and method blanks. The results of the spiked samples are used to calculate the percent recovery for evaluating accuracy.

Percent recovery is calculated using the following formula:

$$\text{Percent Recovery} = \frac{S - C}{T} \times 100$$

where:

S	=	Measured spiked sample concentration
C	=	Sample concentration
T	=	True or actual concentration of the spike

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent the characteristics of a population, parameter variations at a sampling point, or an environmental condition that they are intended to represent. Representativeness of data will be ensured using established field and laboratory procedures and their consistent application. To aid in the evaluation of the representativeness of the sample, field and laboratory blank samples and background samples will be evaluated for the presence of contaminants. Data deemed nonrepresentative, by comparison with the existing data, would be used only if accompanied by appropriate qualifiers and limits of uncertainty.

Comparability

The comparability objective determines whether analytical conditions are sufficiently uniform for each analytical run to ensure that all of the reported data will be consistent. Comparability is ensured using similar analytical methods from one investigation to the next. Analytical techniques that will be used for this field investigation are comparable to techniques used by previous investigations.

Completeness

Completeness is a measure of the percentage of project-specific data that are useable and valid. Valid data are obtained when samples are collected and analyzed in accordance with QC procedures outlined in this QAPP and when none of the QC criteria that affect data usability is exceeded. Other factors not related to the validity of the data can affect completeness, such as lost samples or broken sample containers. The project completeness value will be calculated when sampling is completely finished and all data are validated. Completeness will be calculated by dividing the number of useable sample results by the total number of planned sample results for this source removal. The completeness goal for this project is a 90 percent.

The following subsections discuss field QC and laboratory QC samples for assessing analytical precision, accuracy, and representativeness, procedures for inspecting laboratory supplies and consumables, and procedures for inspecting and calibrating field equipment.

5.1 FIELD QUALITY CONTROL SAMPLES

Field QC samples are used to evaluate the validity of the field sampling effort and are used by the laboratory to check sampling and analytical precision, accuracy, and representativeness. The QC samples include field blanks (source water blanks and equipment rinsate blanks), trip blanks, and field duplicates. Table 7 summarizes the types and frequency of collection of field QC samples.

5.1.1 Source Water Blanks

Source water blanks consist of the source water used as the final rinse on all sampling equipment during decontamination activities. Deionized water from the analytical laboratory will be used for decontamination during field activities. Distilled water is used for the final rinse. At a minimum, one source blank per sampling event or one source blank for each lot or change in source water being used, whichever is greater, will be collected and analyzed for the same sample parameters as the samples collected during the event.

5.1.2 Equipment Blanks

Equipment rinsate blanks are used to evaluate the effectiveness of decontamination procedures. The rinsate blanks will be collected after a sample collection device has been subjected to standard decontamination procedures. Organic-free reagent grade water will be poured over or through the device, collected in a sampling container, and sent blind to the laboratory for analysis. One equipment rinsate blank per type of sampling device will be collected weekly (not to exceed 5 percent of the total number of samples).

5.1.3 Trip Blanks

The purpose of a trip blank is to demonstrate that potential VOCs are not originating from sample containers or from any factor during the transport of samples. A trip blank originates at the laboratory as a 40-milliliter vial typically used for VOC analysis. The vial is filled completely with reagent grade, organic-free water. The trip blanks are then transported to the site with the empty sample containers

used for sample collection. The trip blanks are stored at the site until the proposed field samples have been collected. One trip blank will accompany each sample transport container containing samples for VOC analysis back to the laboratory. The trip blank is not opened until it is returned to the laboratory at the time of analysis. Trip blanks will be analyzed for VOCs.

5.1.4 Field Duplicates

A field duplicate sample is collected at the same time and from the same source as the original sample but is submitted to the laboratory as a separate sample to assess the consistency of the overall sampling and analytical system. Because of the heterogeneous nature of soil, a soil duplicate sample will not be collected. Field duplicate samples are only collected for aqueous matrices. Field duplicates will be collected and analyzed on a 10 percent basis or one sample per week, whichever is greater.

5.2 LABORATORY QUALITY CONTROL SAMPLES

Laboratory QC samples are prepared and analyzed at the laboratory to assess the quality of the preparation and analysis of field samples and to evaluate analytical precision, accuracy, representativeness, and comparability parameters. The types of laboratory QC samples that will be used are discussed in the following sections.

5.2.1 Method Blanks

Method blanks are prepared to determine whether contamination originates from the handling, preparation, and analysis of the sample and are used to distinguish between low-level field contamination and laboratory contamination.

5.2.2 Laboratory Control Samples or Blank Spikes

A laboratory control sample (LCS) or blank spike originates in the laboratory as deionized or distilled water that has been spiked with standard reference materials of a known concentration. These internal QC samples are used to verify the accuracy of calibration standards and to evaluate laboratory accuracy in the absence of the chemical matrix interference related to field samples. LCSs or blank spikes are processed through the same analytical procedure as field samples. Table 5 provides control limits.

5.2.3 Matrix Spike and Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples are analyzed to determine the suitability of an analytical method for a particular environmental sample matrix. The MS sample is prepared using a known concentration of target analytes added to an aliquot of the field sample. A triple volume of water sample will need to be collected to ensure that sufficient sample is available for this QC measure. Samples will be spiked when they are prepared for analysis at the laboratory. MS and MSD samples measure the efficiency of all of the steps of the analytical method in recovering target analytes from an environmental sample matrix. MS and MSD samples are analyzed at a frequency of 5 percent, one for every sample delivery group, one per type of matrix, or one per 20 samples, whichever is more frequent (EPA 1987). Table 5 provides control limits for the evaluation of MS and MSD accuracy and precision.

5.2.4 Surrogate Standards

Surrogate standards consist of known concentrations of non-target analytes that are added to each sample, method blank, LCS, and MS/MSD before they are prepared and analyzed for organic parameters. The surrogate standard measures the efficiency of the analytical method in recovering the target analytes from an environmental sample matrix; they also provide an indication of laboratory accuracy and matrix effects for every field and QC sample analyzed for volatile and extractable organic compounds. Surrogate compounds are used in the analysis of VOCs to monitor purge efficiency and analytical performance.

Data will be qualified as estimated for VOC data that fails to meet surrogate recovery criteria (see Table 5). EPA guidelines for evaluating organic analysis provide additional evaluation criteria (EPA 1999d).

5.2.5 Internal Standards

Internal standards are compounds that are added to every VOC standard, method blank, LCS, MS/MSD, and sample at a known concentration. These standards are used as the basis for quantification of the target compounds. An internal standard is used to evaluate the efficiency of the sample introduction process and serves to monitor the efficiency of the analytical procedure for each sample matrix encountered.

5.3 INSPECTION AND ACCEPTANCE OF SUPPLIES AND CONSUMABLES

Analytical laboratories are required to provide certified clean containers for all analyses. The subcontract laboratories will maintain an inventory of the analytical supplies required for the analytical procedures.

Solvents and reagents used by the laboratories in all analytical procedures will be documented in a laboratory logbook. At a minimum, information regarding the manufacturer, lot number, date received, and date opened should be included. Solvents and reagents will be tested for contamination before use. The results of this procedure and any other quality inspections will be documented in a laboratory notebook.

Subcontractor laboratories will maintain and follow a written standard operating procedure (SOP) for decontaminating glassware used in analytical procedures. Subcontract laboratories will check the calibration of all analytical balances and automatic pipettes on a daily basis and will document the results in a laboratory logbook. Analytical balances will be recalibrated as necessary in accordance with the SOPs written by the laboratory.

Subcontractor laboratories will check the temperature daily of all refrigerators used to store samples, standards, extracts, and other consumables, and will document measured temperatures in a laboratory logbook.

5.4 EQUIPMENT INSPECTION, CALIBRATION PROCEDURES AND FREQUENCY

Measurement equipment to be used during field activities will be calibrated at least once a day, at the beginning of the day. The field team leader (FTL) will be responsible for ensuring that the field equipment is properly calibrated. The frequency of calibration depends on the type and stability of the equipment, the analytical methods employed, the intended use of the equipment, and the recommendations of the manufacturer. Calibration requirements for the field equipment to be used are summarized in Table 8. More detailed calibration procedures for equipment listed in Table 8 are provided in the specific manufacturer's instruction manuals.

All calibration information will be recorded in the field logbook. Additionally, a label specifying the date of the next calibration will be attached to the equipment. If this identification is not feasible, calibration records for the piece of equipment will be readily available for reference.

When a piece of equipment becomes inoperable, it will be removed from service and tagged to indicate that repair, recalibration, or replacement is needed before the equipment can be used again. The FTL will be notified so that the equipment can be promptly serviced or so that substitute equipment can be obtained. Any action of this type will be reported in the daily QC report. Corrective action measures are discussed in Section 7.2 of this QAPP.

All instrument malfunctions will require immediate corrective action. All actions taken should be documented in field logbooks, but no other formal documentation is required unless data quality is adversely affected or further corrective action is necessary. On-the-spot corrective actions will be taken as necessary in accordance with the procedures described in the SOPs.

6.0 DATA QUALITY MANAGEMENT

The following subsections discuss the requirements and methods for data review, verification, and validation.

6.1 DATA REVIEW

Data for the project will be reviewed and verified before being input into the database. At a minimum, 20 percent of the analytical data will be randomly selected and fully validated. The remaining analytical data will undergo cursory validation.

6.2 DATA VERIFICATION

The data generated during field activities must be validated and verified to ensure defensible and acceptable quality. A systematic effort will be made by field and laboratory personnel to identify any outliers (that is, extreme values) or errors in the data. Outliers may result from errors or may represent inherent variability in the medium sampled. Outliers resulting from errors identified during data verification will be corrected. Outliers that cannot be attributed to analytical, calculation, or transcription errors will be reported in the case narrative section of the analytical report.

6.2.1 Verification of Field Data

Project team personnel will check field data to identify any inconsistencies or anomalous values and, if possible, will resolve the errors quickly by discussions with field personnel responsible for data collection.

6.2.2 Verification of Laboratory Data

Laboratory personnel will verify analytical data at the time of analysis and reporting through reviews of the raw data for any non-conformance with the analytical method requirements. Detailed procedures for laboratory verification and corrective action will be provided in the laboratory's QA plan.

6.3 DATA VALIDATION

Analytical data will be validated using the EPA functional guidelines for data validation of organic analyses (EPA 1999d) by a third-party subcontractor. Chemical data evaluation will consider each type of data, the relationship to the entire data set, and the adequacy of the data to fulfill the DQOs (Section 3.1).

Cursory validation will be completed on the data summary packages for analyses of groundwater and soil samples. The data reviewer is required to notify TtEMI and request any missing information needed from the laboratory. Elimination of data from the review process is not allowed.

Full validation will be conducted following CLP functional guidelines (EPA 1999d) as well as method requirements and QC goals identified in this QAPP. Full validation will be required on 20 percent of the data. Cursory validation will be required on the remaining 80 percent of the data. The QC criteria to be reviewed for both cursory and full validations are identified on Table 9.

6.4 ELECTRONIC DATA DELIVERABLES

Electronic data deliverables (EDD) are required for all NWSSBD analytical results. An automated laboratory information management system must be used to produce the EDD. Manual creation of the deliverable (data entry by hand) is unacceptable. The laboratory will verify EDDs internally before they are issued. The EDD will correspond exactly to the hard-copy data. No duplicate data will be

submitted. EDDs will be delivered in a format compatible with the Navy Environmental Data Transfer Standards.

Results that should be included in all EDDs are as follows:

- Target analyte results for each sample and associated analytical methods requested on the chain-of-custody form
- TIC results reported for the volatile organic analyses
- Method and instrument blanks and preparation and calibration blank results reported for the data
- Percent recoveries for the spike compounds in the surrogate sample, MS, MSDs, blank spikes, or LCSs
- Matrix duplicate results reported for the sample delivery group (SDG) form
- All reanalysis, reextractions, or dilutions reported for the SDG, including those associated with samples and the specified laboratory QC samples

EDDs and hard-copy data must be retained for a minimum of 3 and 10 years, respectively, after final data have been submitted. The subcontractor will use electronic storage devices that are capable of recording data for long-term, off-line storage. Raw data will be retained in such a fashion as to promote future accessibility.

7.0 QUALITY ASSURANCE OVERSIGHT

Oversight of QA activities will be conducted through the use of three types of audits: performance, system, and field. Any problems encountered during the field investigation will require appropriate corrective action procedures to ensure that they are resolved. Audits are scheduled at the program level, not the project level. The QA program manager may or may not select this project for an audit; however, whether the project will be subject to an audit is unknown.

7.1 PERFORMANCE, SYSTEM, AND FIELD AUDITS

Audits will be completed at scheduled intervals by the QA program manager, project QA officers, Navy Quality Assurance Officer (QAO), or by senior technical staff and submitted to the SWDIV QAO. Auditors will be independent of the activities audited and will be selected by the project QA manager based on technical expertise and auditing experience. Audits may include reviews of project plan adherence, training status, health and safety procedures, activity performance and records, budget

status, QC data, calibrations, and conformance to SOPs. Audits may also review compliance with laws, regulations, policies, and procedures. After completion of an audit, an audit report will be submitted to the Navy remedial project manager or Navy QAO, and included in the project summary report. The QA program manager will coordinate management review of any deficiencies noted.

Through the use of a corrective-action request form, the auditor or audit team can identify specific corrective actions to be undertaken by the project managers. After verification of satisfactory completion of corrective actions, the corrective-action request form will be used to close the audit. The Navy QAO may suspend field activities if deficiencies warrant it or corrective actions are not completed.

7.1.1 Performance Audits

A performance audit comprises a review of the QC data to determine the accuracy of a total measurement system or a component of the system. Both the Navy and TtEMI will conduct laboratory performance audits before that laboratory can accept samples. Internal audit routines for the laboratory are described in the laboratory QA plan. The Navy will provide to the EPA any audit reports related to the project that are anticipated to qualify or otherwise adversely affect a laboratory test result.

To further evaluate the laboratory performance, performance evaluation (PE) samples will be submitted to the selected laboratory for analysis. The purpose of the PE samples is to ensure that the subcontract laboratory performing the sampling analysis can meet the quality control and quality assurance requirements of TtEMI and the CLEAN II program. Additionally, the PE sample results will be used to demonstrate that the extraction, cleanup, and analytical methods used for the confirmation sampling are appropriate. The Navy will submit to the lab one double-blind PE for both soil and water for VOC analysis and will provide the results of the PE sample results upon request to the EPA.

When the laboratory knows that a sample is a PE sample but does not know the identity or concentrations of the PE sample constituents, the samples are known as "single-blind" PE samples. When the laboratory receives samples that are masquerading as field samples and has not been informed that the samples are PE samples, the samples are known as "double-blind" PE samples.

7.1.2 System Audits

A system audit is used to verify adherence to QA policies and SOPs. This type of audit may consist of on-site review of measurement systems, procedures for measurement, QC, and documentation. If the QA program manager selects this program for system audits, the first system audit is conducted shortly after a system becomes operational and on a regularly scheduled basis thereafter.

7.1.3 Field Audits

A field audit involves an on-site visit by the auditor or audit team. Items to be examined include the availability and implementation of approved field procedures; calibration and operation of equipment; chain-of-custody procedures; packaging, storage, and shipping of samples; health and safety procedures; documentation of procedures and instructions; and nonconformance documentation.

7.2 CORRECTIVE ACTION PROCEDURES

Two types of corrective actions exist: immediate and long term. Immediate corrective actions include correction of documentation deficiencies or errors, repair of inaccurate instrumentation, or correction of inadequate procedures. The source of the problem is generally obvious and can be corrected at the time of the observation. Long-term corrective actions are designed to eliminate the sources of problems. Examples of long-term corrective actions include the correction of systematic errors in sampling or analysis and the correction of procedures producing questionable results. Corrections can be made through additional personnel training, instrument replacement, or procedural improvements. All QA problems and corrective actions will be documented to provide a complete record of QA activities and to help identify needed long-term corrective actions.

7.2.1 Field Corrective Action Procedures

Field nonconformance conditions are defined as occurrences or measurements that either are unexpected or do not meet established acceptance criteria and could affect data quality. Examples of nonconformance conditions are as follows:

- Incorrect use of field equipment
- Improper sample collection, preservation, or shipment procedures
- Incomplete field documentation

- Incorrect decontamination procedures
- Incorrect collection of QC samples

In cases where field personnel implement immediate and complete corrective actions, the corrective action will be recorded in the field logbook and summarized in the daily QC report. Nonconformance conditions that could have a substantial impact on data quality require the completion of a corrective action request form. This form may be filled out by an auditor or by any individual who suspects that any aspect of data integrity is being affected by a field nonconformance. Each form is limited to a single nonconformance. If additional problems are identified, multiple forms will be used for documentation. An example of a corrective action request form is presented in Appendix B. Copies of the corrective action request form will be distributed to the project manager, the field team leader, the project QA manager, and the project file. The project manager, field team leader, and the project QA manager will meet to discuss the appropriate steps to resolve the problem.

A corrective action status report will be used by the project QA manager to monitor the status of all corrective actions. A follow-up review will be conducted to ensure that the corrective action has adequately and permanently corrected the problem.

The QA program manager can require data acquisition to be limited or discontinued until the corrective action is complete and the nonconformance is eliminated. The QA program manager can also request the reanalysis of any or all data acquired since the system was last in control.

7.2.2 Laboratory Corrective Action Procedures

Internal laboratory procedures for corrective action are contained in the laboratory QA plan. At a minimum, corrective action will be implemented when any of the following three conditions occur: control limits are exceeded, method QC requirements are not met, or sample-holding times are exceeded. Out-of-control situations will be reported to the project analytical coordinator within 2 working days of identification. In addition, a corrective action report signed by the laboratory director or project manager and the laboratory QC coordinator will be provided to the project analytical coordinators.

7.3 REPORTS TO MANAGEMENT

Several reports addressing QA will be prepared during the course of the fieldwork at NWSSBD addressing QA. These reports include the daily QC report, the project monthly progress report, and the QC summary report (QCSR).

The daily QC report is prepared by the field team leader and summarizes daily field activities throughout the field program including any QA/QC activities, health and safety activities, problems encountered, and corrective actions taken. The content of the reports will be summarized and included in the final report submitted for the field investigation.

The project monthly progress report is prepared by the project manager on a monthly basis and submitted to the Navy remedial project manager. This report will include the following:

- Status of the project
- Instrument, equipment, or procedural problems affecting the project and recommended solutions
- Objectives from the previous monthly report achieved
- Objectives from the previous monthly report not achieved
- Work planned for the next month

The QCSR will be prepared by TtEMI and submitted to the Navy remedial project manager with the final report for the activity. The QCSR will include a summary and evaluation of the QC completed during the task and will indicate the duration and location of storage for the complete data packages. Particular emphasis will be placed on determining whether project DQOs were met and whether data are of sufficient quality to support required decisions.

8.0 REFERENCES

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EPA. 2000. U.S. EPA Contract Laboratory Program, Multi-Media, Multi-Concentration, Organic Analytical Statement of Work, Document Number OLM04.2. January.

U.S. Navy, Naval Facilities Engineering Service Center (NFESC). 1999. Navy Installation Restoration Laboratory Chemical Data Quality Manual. September.

U.S. Navy, Southwest Division (SWDIV), Naval Facilities Engineering Command. 1999a. Environmental Work Instruction 4 EN.1, Chemical Data Validation. October 18.

SWDIV 1999b. Environmental Work Instruction 4EN.2, Review, Approval, Revision and Amendment of Field Sampling Plans and Quality Assurance Project Plans. October 18.

SWDIV 1999c. Environmental Work Instruction 4EN.3, Laboratory Quality Assurance Program (LQAP). October 18.

TABLE 1

PROPOSED ANALYTICAL PROGRAM
FOR SWMUs 1, 2, 5, 7, AND 18
NAVAL WEAPONS STATION, SEAL BEACH DETACHMENT CONCORD
CONCORD, CALIFORNIA

NUMBER OF SAMPLES		
Sample Type	**Water for VOC Analysis**	**Soil for VOC Analysis**
Geoprobe® borings	31	0
Step out groundwater samples	TBD	0
Follow up soil source sampling	0	TBD
Step out soil source samples	0	TBD
Trip blank[a]	7[b]	0
Field duplicate[c]	3[b]	0
Source water blank[d]	2[b]	0
Equipment rinsate[e]	2[b]	0
Double-blind PE samples	1	1
TOTAL	**46[b]**	**TBD**

Notes:

a	One per cooler shipment; only included with VOC samples
b	Approximate
c	One per week or 10% of the total number of samples, whichever is greater
d	One per sampling event
e	One per week not to exceed 5% of the total number of samples
PE	Performance evaluation
TBD	To be determined
VOC	Volatile organic compounds

TABLE 2

DATA QUALITY OBJECTIVE STEPS
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD
CONCORD, CALIFORNIA

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7
State the Problem	**Identify the Decisions**	**Identify the Inputs to the Decisions**	**Define Study Boundaries**	**Develop Decision Rules**	**Specify Tolerable Limits on Errors**	**Optimize Sampling Design**
The nature and extent of VOC's detected in groundwater at SWMUs 1, 2, 5, 7 and 18 have not been adequately defined. The source of VOCs in groundwater is not known. VOCs in groundwater may pose a risk to human and ecological receptors.	Is the extent of VOCs in groundwater adequately defined by samples with non-detects or detected concentrations below screening criteria? Do VOC affected soils exist at concentration above screening criteria overlying the area of VOC-affected groundwater? If VOC-affected soils exist above screening criteria is extent adequately defined by samples with detected concentrations below screening criteria? What is the source of VOCs in groundwater and soil, if present?	Validated defensible chemical data for groundwater and soil samples. Existing well elevation data adequate to construct a groundwater contour map of the study area. Background information on historical activities at the study area. VOC analytical results from previous investigations and quarterly monitoring well sampling events in and adjacent to the study area. Residential preliminary remediation goals for VOCs in soil. State and federal maximum contaminant levels (MCLs) and RWQCB Basin Plan guidelines for VOCs in groundwater. Proposed future uses for the sites.	The spatial boundaries of the study area are the SWMUs 1, 2, 5, 7, and 18 site limits. The vertical boundaries are defined as 0 to approximately 25 feet below ground surface. The temporal boundaries extend from the time of the first release of the first release, through the historical investigations conducted, and end with a document and summary of conditions as well as a determination from the agencies and the navy for additional FS studies or a determination of site evaluation accomplished.	If the VOCs in groundwater are not adequately defined by samples with detected concentrations below screening criteria then step out groundwater samples will be collected. If the area of VOCs in groundwater are adequately defined then follow-up soil source sampling will be conducted from soils overlying the affected groundwater area. If VOC-affected soil is encountered and the area of affected soil is not adequately defined by samples with detected concentrations below screening criteria then additional step out soil samples will be collected. If elevated VOC concentrations in soil are found in overlying areas of affected groundwater, then the soil in the area is a potential source to groundwater.	Nonrandom, judgemental sampling is being used. A statistical model is not appropriate. Measurement quality objectives, in the form of precision and accuracy goals, are designed to minimize analytical errors.	The sample design is based on professional judgement of site specific hydrogeological conditions. The 31 initial borings for groundwater sampling will be located to define the nature and extent of VOC contaminats and investigate potential source areas. Step out borings, if needed, will be judgmentally placed based on initial groundwater analytical results. The locations of the borings proposed for soil source sampling will be based on the groundwater sampling results. Four discrete soil samples will be collected from each boring at 2, 6, 10, and 14 feet below ground surface or in areas of visually impacted soil. Professional judgement will be used to locate step out borings if VOC contaminated soil is encountered and step out samples are necessary to adequately delineate the area of affected soil.

Notes:

DQO	Data quality objective
MCLs	Maximum contaminant levels
QC	Quality control
RWQCB	Regional Water Quality Control Board
SWMU	Solid waste management unit
VOC	Volatile organic compound

TABLE 3

ANALYTICAL METHODS
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD
CONCORD, CALIFORNIA

Parameter	Sample Matrix	Method Number	Extraction Technique	Reference[a]	Analyte List	Sample Analysis Technique
Organic Analyses						
VOCs	Groundwater	CLP SOW	Purge and Trap	EPA 1996, 2000	TCL + 10 TIC	GC/MS
VOCs	Soil	CLP SOW	Purge and Trap	EPA 2000	TCL + 10 TIC	GC/MS

Notes:

a EPA 1996. U.S. EPA Contract Laboratory Program, Statement of Work for Organic Analysis, Low Concentration Water, Document Number OLC02.1. February.
EPA 2000. U.S. EPA Contract Laboratory Program, Multi-media, Multi-concentration, Organic Analytical Statement of Work, Document Number OLM04.2. January.

CLP Contract laboratory program
EPA U.S. Environmental Protection Agency
GC/MS Gas chromatography/Mass spectrometry
SOW Statement of work
TCL Target Compound List
TIC Tentatively identified compounds
VOC Volatile organic compounds

TABLE 4

CONTRACT-REQUIRED QUANTITATION LIMITS AND SCREENING CRITERIA FOR VOLATILE ORGANIC COMPOUNDS NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD CONCORD, CALIFORNIA

Volatiles	Groundwater (µg/L)[a]	Basin Plan (µg/L)	MCLs (µg/L)	Soil (µg/kg)[b]	Residential PRGs for Soil (µg/kg)
Chloromethane	1	--	--	10	1,200
Bromomethane	1	--	--	10	3,900
Vinyl chloride	1	0.5	0.5	10	22
Chloroethane	1	--	--	10	--
Methylene chloride	2	5	5	10	8,900
Acetone	5	--	--	10	1,600,000
Carbon disulfide	1	--	--	10	360,000
1,1-Dichloroethene	1	6	6	10	54
1,1-Dichloroethane	1	5	5	10	590,000
1,2-Dichloroethene	1	6[c]	6[c]	10	43,000[d]
Chloroform	1	--	100	10	240
1,2-Dichloroethane	1	0.5	0.5	10	350
2-Butanone	5	--	--	10	7,300,000
1,1,1-Trichloroethane	1	200	200	10	770,000
Carbon tetrachloride	1	0.5	0.5	10	240
Vinyl Acetate	10	--	--	10	430,000
Bromodichloromethane	1	--	100	10	1000
1,2-Dichloropropane	1	5	5	10	350
cis-1,3-Dichloropropene	1	0.5[d]	0.5[d]	10	82[d]
Trichloroethene	1	5	5	10	2,800
Dibromochloromethane	1	--	100	10	1,100
1,1,2-Trichloroethane	1	5	5	10	840
Benzene	1	1	1	10	670
trans-1,3-Dichloropropene	1	0.5[d]	0.5[d]	10	82[c]
Bromoform	1	--	100	10	62,000
4-Methyl-2-pentanone	5	--	--	10	70,000
2-Hexanone	5	--	--	10	--
Tetrachloroethene	1	5	5	10	5,700
Toluene	1	150	150	10	520,000
1,1,2,2-Tetrachloroethane	1	1	1	10	380
Chlorobenzene	1	--	70	10	150,000
Ethylbenzene	1	700	700	10	230,000
Styrene	1	100	100	10	1,700,000
Total xylenes	1	1,750	1,750	10	210,000[f]
Methyl tertiary-butyl ether (MTBE)	10	--	13	10	--

Notes:

a Contract-required quantitation limits (EPA 2000) listed for water analysis. Where available, contract-required quantation limits (EPA 1996) for low concentration water analysis were reported.

b Contract-required quantitation limits (EPA 2000) listed for soil analysis are based on wet weight. The quantitation limits reported by the laboratory for soil and other solid matrices, calculated on dry-weight basis as required by the contract, will be higher.

c The lower of cis-1,2-dichloroethene (6 µg/L) and trans-1,2-dichloroethene (10 µg/L)

d Value for 1,3-dichloropropene

TABLE 4

CONTRACT-REQUIRED QUANTITATION LIMITS AND SCREENING CRITERIA FOR VOLATILE ORGANIC COMPOUNDS NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD CONCORD, CALIFORNIA

e The lower of cis-1,2-dichloroethene (43,000 µg/kg) and trans-1,2-dichloroethene (63,000 µg/kg)
f The lower of m-xylene (210,000 µg/kg), o-xylene (280,000 µg/kg), and p-xylene (370,000 µg/kg)
µg/kg Micrograms per kilogram
µg/L Micrograms per liter

Regional Water Quality Control Board (RWQCB). 1995. Water Quality Control Plan. Oakland, California. June 21.
RWQCB. 2000. A Compilation of Water Quality Goals. Sacramento, California. August.
U.S. Environmental Protection Agency (EPA). 1999. Region IX Preliminary Remediation Goals (PRGs)—1999. October 1.

TABLE 5

METHOD PRECISION AND ACCURACY GOALS[a] FOR VOLATILE ORGANIC COMPOUNDS NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD CONCORD, CALIFORNIA

Matrix Spike Compound	Water		Soil	
	% Recovery	RPD	% Recovery	RPD
1,1-Dichloroethene	61 to 145	14	59 to 172	22
Trichloroethene	71 to 120	14	62 to 137	24
Chlorobenzene	75 to 130	13	60 to 133	21
Toluene	76 to 125	13	59 to 139	21
Benzene	76 to 127	11	66 to 142	21

Surrogate Spike Compound	Water	Soil
	% Recovery	% Recovery
Toluene-d8	88 to 110	84 to138
Bromofluorobenzene	86 to 115	59 to 113
1,2-Dichloroethane-d4	76 to 114	70 to 121

Field Duplicate	Water	Soil
	RPD	RPD
Field Duplicate	30	NA

Note:

a From U.S. Environmental Protection Agency, Contract Laboratory Program, Statement of Work for Organic Analysis (EPA 1999). Laboratory derived control limits supercede these goals.

NA Not applicable

RPD Relative percent difference

TABLE 6

SAMPLE CONTAINERS, HOLDING TIMES, AND PRESERVATIVE REQUIREMENTS NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD CONCORD, CALIFORNIA

Parameter	Sample Matrix	Sample Container	Number of Containers	Preservatives	Holding Time[a]
VOC	Groundwater	40-mL vial with Teflon-lined cap	3	HCl to pH < 2; Cool, 4°C	14 days
VOC	Soil	Encore Sampler	3	Cool, 4°C; sodium bisulfate and methanol at laboratory[b]	Analyze within 48 hours or 14 days after preservation

Notes:

a Holding time duration is from time of collection for all methods.
b Two containers preserved with sodium bisulfate and one container with methanol.
C Centigrade
HCl Hydrochloric acid
mL Milliliter
VOC Volatile organic compound

TABLE 7

FIELD QUALITY CONTROL SAMPLES
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD
CONCORD, CALIFORNIA

Sample Type	Frequency of Analysis
Field duplicate	10 percent or one per week, whichever is greater (water samples only)
Trip blank	1 per cooler
Source water blank	1 per source per event for all analytes[a]
Equipment rinsate	1 per week not to exceed 5 percent of the total number of samples

Notes:

a A sampling event is defined as a period of time during which sampling activities occur. An extended absence, followed by a return to the site would constitute two events.

TABLE 8

FIELD EQUIPMENT CALIBRATION AND PREVENTIVE MAINTENANCE NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD CONCORD, CALIFORNIA

FIELD EQUIPMENT CALIBRATION				
Instrument Type	**Standard Reference**	**Calibration Technique**	**Calibration Frequency**	**Acceptance Specifications**
Water-Level Indicator	Measurement tape	Manufacturer's user manual	Before commencement of field activity	+/- 10% of measurement tape value
Photoionization Detector	Gas standard kit (isobutylene)	Manufacturer's user manual	Before use and at end of the daily collection	+/- 10% of standard ppm concentration

FIELD EQUIPMENT PREVENTIVE MAINTENANCE	
Instrument Type	**Maintenance Tasks**
Water-Level Indicator	• Check charge on battery regularly. Recharge or replace, as appropriate. • Rinse probe and tape after use. • Inspect cable and all electrical connections for breaks and/or bare wire.
Photoionization Detector	• Check charge on battery regularly. Recharge or replace, as appropriate. • Check ultraviolet (UV) lamp and ion chamber for cleanliness. • Clean probe if deposits develop on UV lamp surface or in ion chamber. • Clean air fan and/or pump if sand grains or dirt are present. • Test for leaks by plugging the inlet. • Regularly clean and maintain the instrument and accessories.

Notes:

ppm parts per million
UV Ultraviolet

TABLE 9

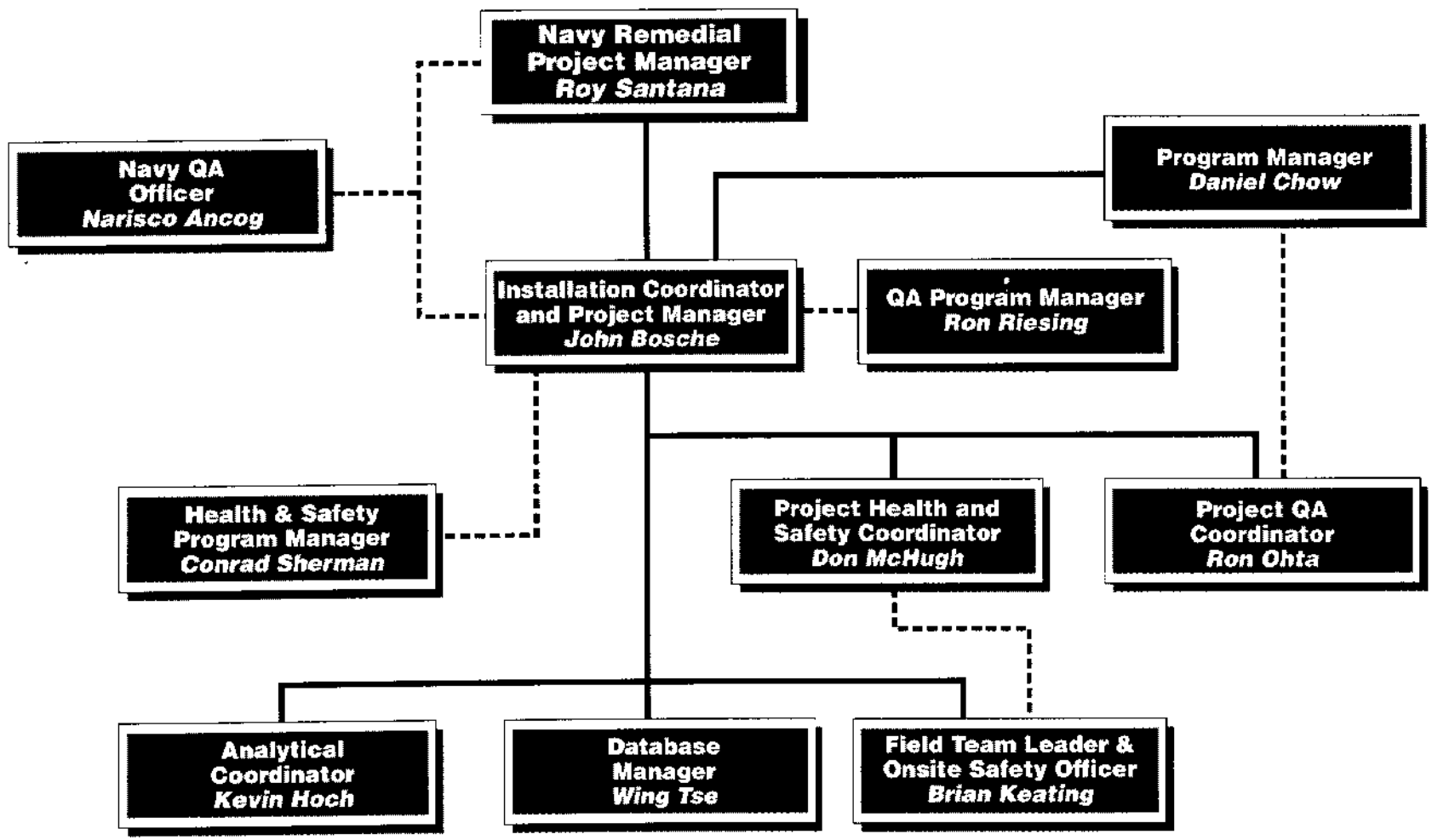
CRITERIA FOR DATA VALIDATION
CONTRACT LABORATORY PROGRAM ANALYSIS
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD
CONCORD, CALIFORNIA

Data Validation	Organic Analyses
Cursory Data Validation	• Method compliance • Holding times • Calibration • Blanks • Surrogate recovery • MS and MSD recovery • Blank spike or LCS recovery • Internal standard performance • Other laboratory QC specified by the method • Overall assessment of data for project • Field duplicate sample analysis
Full Data Validation	• Method compliance • Holding times • Calibration • Blanks • Surrogate recovery • MS and MSD recovery • LCS or blank spike • Internal standard performance • Field duplicate sample analysis • Other laboratory QC specified by the method • Detection limits • Compound identification • Compound quantitation • Sample results verification • Overall assessment of data for project

Notes:

LCS Laboratory control sample
MS Matrix spike
MSD Matrix spike duplicate
QC Quality control

5506TC01.CDR 030900



LEGEND

LINES OF AUTHORITY

LINES OF COMMUNICATION

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND

ENGINEERING FIELD ACTIVITY WEST

NAVAL WEAPONS STATION, SEAL BEACH DETACHMENT — CONCORD, CALIFORNIA

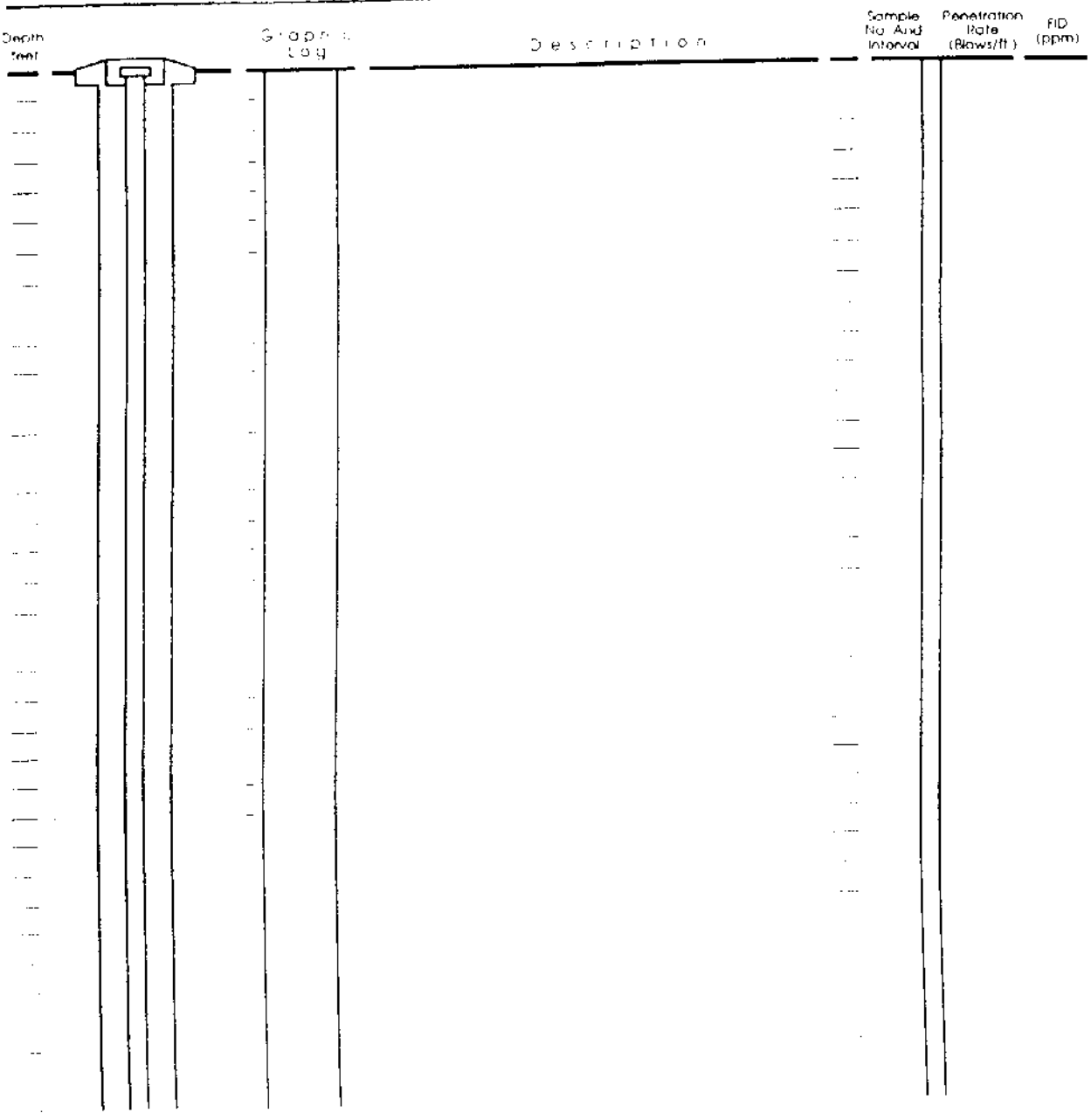
FIGURE 1

PROJECT ORGANIZATION

DS0324.15677

APPENDIX A

SAMPLE COLLECTION AND ANALYSIS FORMS



WELL CONSTRUCTION AND LITHOLOGY FOR

FIELD LOG OF WELL CONSTRUCTION AND LITHOLOGY

DS0324.15677

Project Name:

Project No.:

Field Personnel:

Date:

General Observations:

WELL NO.	WELL ELEVATION	DEPTH TO WATER MEASUREMENTS 1	2	WATER ELEVATION	REMARKS (UNITS = FEET)

WATER-LEVEL MEASUREMENTS FORM

LOCATION NO. _____ SAMPLE NO. _____

PROJECT NO. _____ DATE COLLECTED _____

PRESERVATIVES _____ TIME _____

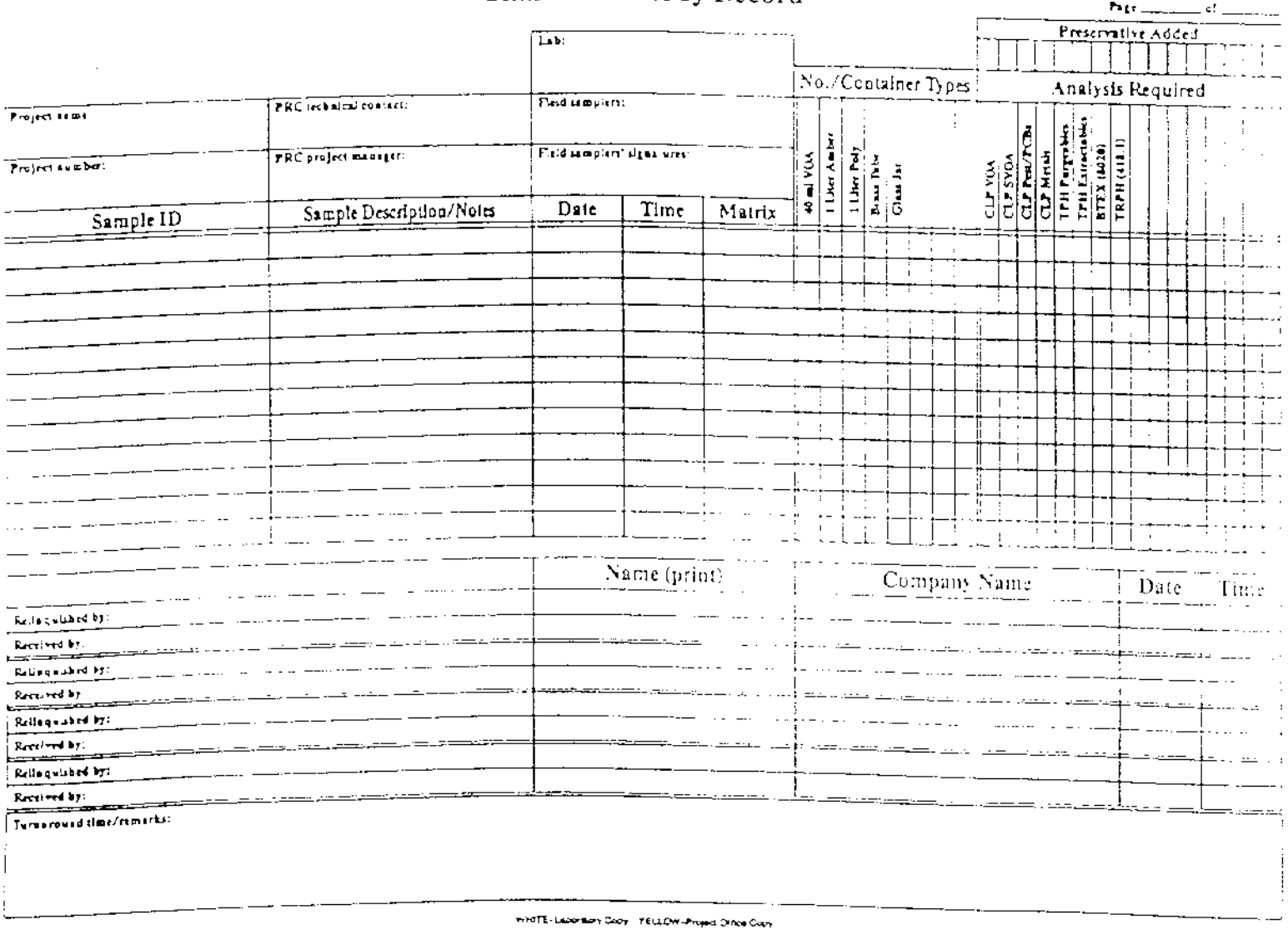
ANALYSES REQUESTED _____

REMARKS _____

SAMPLE LABEL

DS0324.15677

Chain of Custody Record



SAMPLE CHAIN-OF-CUSTODY RECORD

Well ID: _____
Depth to Water: _____
Well Depth: _____
Height of Water Column: _____
Volume in Well: _____

Date: _____
Time: _____
Samplers: _____
Well Diameter:

- ☐ 2" (0.16 gallons/foot)
- ☐ 4" (0.65 gallons/foot)
- ☐ 6" (1.47 gallons/foot)

Purge Method: _____

Purge Record:

Time	Depth to Water	Volume purged (gal)	Flow Totalizer Reading	Temp. (C)	pH	Cond. (mohs)	Turbidity (NTU)	Diss. O_2	Salinity	Remarks

Sample ID: _____ Sample Method: _____

- ☐ 2 x 40 ml vial w/ HCl for VOCs - Containers V1 and V2
- ☐ 2 x 40 ml vial for Isotopes - Containers D1 and D2
- ☐ 2 x 40 ml vial for TPH-purgeable - Container P1 and P2
- ☐ 2 x 1 liter amber for SVOCs - Containers S1 and S2
- ☐ 2 x 1 liter amber for TPH-extractable - Containers E1 and E2
- ☐ 1 x 1 liter polyethylene for General Minerals - Container G1
- ☐ 1 x 1 liter polyethylene w/ HNO_3 for Metals** - Container M1
- ☐ 1 x 1 liter polyethylene w/ HNO_3 for Metals* - Container M2

*USE 0.45 MICRON FILTER **Additional unfiltered sample should be labeled M3

D F Duplicate ID: _____ Field Blank ID: _____

- ☐ ☐ 2 x 40 ml vial w/ HCl for VOCs - Containers V1 and V2
- ☐ ☐ 2 x 40 ml vial for Isotopes - Containers D1 and D2
- ☐ ☐ 2 x 40 ml vial for TPH-purgeable - Container P1 and P2
- ☐ ☐ 2 x 1 liter amber for SVOCs - Containers S1 and S2
- ☐ ☐ 2 x 1 liter amber for TPH-extractable - Containers E1 and E2
- ☐ ☐ 1 x 1 liter polyethylene for General Minerals - Container G1
- ☐ ☐ 1 x 1 liter polyethylene w/ HNO_3 for Metals** - Container M1
- ☐ ☐ 1 x 1 liter polyethylene w/ HNO_3 for Metals* - Container M2

*USE 0.45 MICRON FILTER **Additional unfiltered sample should be labeled M3

Lab: _____ Method of shipment: _____
Chain of Custody #: _____

WATER-QUALITY SAMPLING INFORMATION FORM

DS0324.15677

APPENDIX B

CORRECTIVE ACTION REQUEST FORM

Corrective Action Request Form

(Page 1 of 2)

Tetra Tech EM Inc.

Project Name: _____ **Date:** _____

Project No.: _____ **Project Manager:** _____

Location: _____

To (Project Manager): _____

From (Audit Team Members): _____

Description Problem:

_____

_____

_____

_____

Corrective Action Required:

_____

_____

_____

_____

The above corrective action must be completed by (Date): _____

Acknowledgement of Receipt

_____

(Signature and Date)

Corrective Action Request Form

Tetra Tech EM Inc.

Corrective Action Taken:

_____

_____

_____

_____

Project Manager: _____

(Signature and Date)

Audit Team Members:

Corrective Action *is / is not* satisfactory

_____

(Date and Initial)

Remarks: _____

_____

_____

_____

_____

QC Coordinators:

Corrective Action *is / is not* satisfactory

_____

(Date and Initial)

Remarks: _____

_____

_____

_____

_____

cc: **Program QA Manager**

APPENDIX C

RESPONSES TO AGENCY COMMENTS ON THE DRAFT QAPP

Navy Responses to EPA Comments on the
Draft Quality Assurance Project Plan
Remedial Investigation for Groundwater, SWMU Sites 2, 5, 7, and 18
Naval Weapons Station, Concord, California

This provides the Navy's response to agency comments received from the U.S. Environmental Protection Agency (EPA) regarding the "Draft Quality Assurance Project Plan, Remedial Investigation for Groundwater, SWMU Sites 2, 5, 7, and 18 (FSP)," dated May 31, 2000. Roberta Blank of the EPA submitted two sets of comments to the Navy dated July 20, 2000. The first set of comments was from the EPA's consultant, Tech Law Inc. The second set of comments was from Joe Eidelberg and Vance S. Fong of the EPA's Quality Assurance Management Section. No other agency comments were received on the QAPP.

Please note that the following agency comments and Navy responses are focused on the QAPP. Agency comments and Navy responses for the related Field Sampling Plan (FSP) are contained in a separate Navy response to comments.

GENERAL COMMENTS BY THE EPA'S REVIEWER, TECH LAW INC.

Comment 1.	**The QAPP references other documents that were not available for review; for example, the Southwest Division (SWDIV) Environmental Work Instruction No. 1 and the Navy Installation Restoration Chemical Data Quality Manual. The last paragraph of Section 3.1 of the EPA document (QA/R-5) entitled "EPA Requirements for Quality Assurance Project Plans" (the Guidance) states "Current versions of all referenced documents must be attached to the QAPP itself or be placed on file with the appropriate EPA office and available for routine referencing when needed." To facilitate the review process, please provide all referenced documents for review. In addition, please revise all QAPP references to include the specific section and subsection where the intended information can be found.**
Response	The information included in the referenced Navy documents frequently is a reiteration of published EPA requirements or guidance. The Navy will strive to avoid unnecessary reference to Navy documents when redundancy is apparent. Inclusion or attachment of all referenced documents to all QAPPs is not practical; adding volumes of additional documents becomes redundant. The Navy proposes submitting either a hard copy or an electronic version on CD-ROM for EPA's reference files.

Navy Responses to EPA Comments on the
Draft Quality Assurance Project Plan
Remedial Investigation for Groundwater, SWMU Sites 2, 5, 7, and 18
Naval Weapons Station, Concord, California

Comment 6.	**Section 4.0, Sample Custody and Documentation Procedures, Page 18: This section provides general statements such as "Industry-standard sample custody procedures will be used to maintain and document sample integrity during collection, transportation, storage, and analysis." and "Industry-standard field documentation procedures will be used to maintain an accurate account of field activities." However, Section 3.3.3 of the Guidance states that a description of the procedures for sample handling and custody in the field, laboratory, and transport, taking into account the nature of the samples, the maximum allowable holding time, and available shipping options should be included in the QAPP. For consistency with the Guidance, please revise the QAPP to describe:** **All sample handling procedures to ensure that samples are collected, transferred, stored, and analyzed by authorized personnel;** **How sample integrity is maintained during all phases of sample handling and analysis; and,** **How an accurate written record of sample handling and custody is maintained from the time of sample collection through laboratory procedures to sample disposal.** **Alternatively, a specific reference to the appropriate sections of the field sampling plan for each of the requirements listed above should be provided.**
Response	The inclusion of details describing sample handling during sample analysis and through sample disposal seems excessive since those elements are normally addressed in the laboratory QA plans and procedures. See response to General Comment 2.
Comment 7.	**Section 5.0, Quality Assurance Procedures, Page 20: This section describes the field and laboratory QA/QC program to obtain accurate and representative samples and data. However, the precision, accuracy, representativeness, comparability and completeness (PARCC) parameters have not been defined. Therefore, please revise the QAPP to provide qualitative and quantitative expressions for precision, accuracy and completeness as well as qualitative expressions for representativeness and comparability. It should be noted that completeness is defined as the total number of data results obtained divided by the total number of data results planned multiplied by 100.**
Response	The QAPP will be revised to incorporate the definitions of PARCC parameters.

Navy Responses to EPA Comments on the
Draft Quality Assurance Project Plan
Remedial Investigation for Groundwater, SWMU Sites 2, 5, 7, and 18
Naval Weapons Station, Concord, California

Comment 8.	**Section 5.1.2, Equipment Blanks, Page 21: This section states that equipment rinsate blanks will be collected on a weekly basis. However, this sampling frequency may not be sufficient to adequately assess cross contamination from sampling equipment. Equipment rinsate blanks should be collected at a frequency of one per twenty or fewer investigative samples. For consistency with the Guidance, please revise the QAPP to modify the equipment rinsate blank QC criteria to reflect this collection frequency.**
Response	Equipment blanks are effective tools for evaluating the effectiveness of the equipment decontamination process and have been incorporated into the Navy's environmental work within EPA Region 9 for more than 10 years. Although equipment blanks serve a valuable purpose, the Navy's decontamination procedures are well established and recent equipment blank results are rarely positive. In the Navy's opinion, the requested equipment blank frequency is excessive. Further, across the Navy's CLEAN program, the suggested equipment blank frequency would result in significant additional cost. The Navy believes that the frequency of equipment blanks should be tailored to the specific needs of each project. The Navy does not propose any revision to the QAPP in response to this comment.
Comment 9.	**Section 5.1.4, Field Duplicates, Page 21: This section states " Because of the heterogeneous nature of soil, a soil duplicate sample will not be collected." This is also noted on Table 7. However, field duplicate samples for soil are useful in assessing sample representativeness and comparability. Therefore, please revise this section and Table 7 of the QAPP to state that field duplicates for soils will be collected at a frequency of 10%.**
Response	True field duplicates cannot be collected for soil samples. Sampling adjacent areas only provides information on the spatial variability for the distance of separation from the sample to the duplicate. Therefore, the Navy disagrees with the implication that field duplicates for soil are useful in all cases. When soil field duplicates taken as adjacent samples show a discrepancy, sample results are not qualified (in accordance with EPA Functional Guidelines). Rather, wide discrepancies in field duplicate results are typically attributed to the heterogeneous nature of soils and the spatial separation of the duplicate, and the discrepancy is dismissed. Therefore, soil field duplicates will not be collected unless they are explicitly required to achieve project data quality objectives.
Comment 10.	**Section 5.2.4, Surrogate Standards, Page 22: The second paragraph references "EPA 1999b" for the EPA guidelines for evaluating organic analyses. However, the "EPA 1999b" reference is incorrect. It appears the correct reference is "EPA 1999d". For accuracy, please revise the QAPP to clarify the reference.**
Response	The QAPP reference will be revised as suggested.

Navy Responses to EPA Comments on the
Draft Quality Assurance Project Plan
Remedial Investigation for Groundwater, SWMU Sites 2, 5, 7, and 18
Naval Weapons Station, Concord, California

Comment 11.	**Section 5.4, Equipment Inspection, Calibration Procedures, and Frequency, Page 23: This section describes the preventive maintenance for laboratory equipment. However, Section 3.3.6 of the Guidance requires a description of inspection and acceptance testing of all instruments and equipment to ensure their use as specified be included in the QAPP. Guidance also requires a discussion of how the availability of critical spare parts will be assured and maintained for all field and laboratory instruments. For consistency with the Guidance, please revise the QAPP to discuss or reference the inspection and acceptance testing as well as critical spare parts that will ensure proper instrument usage for both field and laboratory equipment.**
Response	The Navy does not intend to add the above requested information to the QAPP because the inclusion of laboratory SOPs and detailed laboratory practices would add significant volume to the QAPP without providing any additional assurances of project quality. The requested information does not include any unique project-specific procedural information. Please see response to General Comment 2. The Navy is also concerned that adding such details in this area would imply that additional similar detail needs to be included for all portions of the document, which would make the document much bulkier and less useful.
Comment 12.	**Section 5.4, Equipment Inspection, Calibration Procedures, and Frequency, Page 23: This section provides only very limited information regarding initial calibration. Section 3.3.7 of the Guidance states "Identify the certified equipment and standards used for calibration." For consistency with the Guidance, please revise the QAPP to either describe or provide specific references to:** **Field instrument initial calibration;** **Field instrument continuing calibration;** **Laboratory initial calibration (including 2-5 point initial curve);** **Laboratory initial calibration verification; and,** **Continuing calibration.** **The discussions should include all quality control criteria used to ensure acceptable calibration (e.g. tuning criteria) and discuss the corrective actions to be used when either the initial or continuing calibrations fail.**
Response	The Navy does not intend to add the above requested information to the QAPP because the inclusion of laboratory SOPs and detailed laboratory practices would add significant volume to the QAPP without providing any additional assurances of project quality. The requested information does not include any unique project-specific procedural information. Please see response to General Comment 2. The Navy is also concerned that adding such details in this area would imply that additional similar detail needs to be included for all portions of the document, which would make the document much bulkier and less useful.

Navy Responses to EPA Comments on the
Draft Quality Assurance Project Plan
Remedial Investigation for Groundwater, SWMU Sites 2, 5, 7, and 18
Naval Weapons Station, Concord, California

Comment 13.	**Section 6.0, Data Quality Management, Page 24: This section does not describe the project data management process. Section 3.3.8 of the Guidance requires a description of:** **The data management process, tracing the path of the field and laboratory data from their generation to their final use and storage;** **The standard record keeping procedures, document control system, and the approach used for data storage on electronic media;** **The control mechanism for detecting and correcting errors and for preventing loss of data during data reduction and reporting; and,** **All data handling equipment and procedures to process, compile, and analyze the data.** **For consistency with the Guidance, please revise the QAPP to provide a discussion of these items for all field and laboratory data management processes.**
Response	The Navy does not intend to add the above requested information to the QAPP because the inclusion of laboratory SOPs and detailed laboratory practices would add significant volume to the QAPP without providing any additional assurances of project quality. The requested information does not include any unique project-specific procedural information. Please see response to General Comment 2. The Navy is also concerned that adding such details in this area would imply that additional similar detail needs to be included for all portions of the document, which would make the document much bulkier and less useful.
Comment 14.	**Section 6.0, Data Quality Management, Page 24: This section is referenced on the table in Section 1.2 to contain documentation and record information. However, the discussion of record management is incomplete. Section 3.2.9 of the Guidance states "Identify any other records and documents applicable to the project that will be produced, such as audit reports, interim progress reports, and final reports...Specify or reference all applicable requirements for the final disposition of records and documents, including location and length of retention period.". For consistency with the Guidance, please revise the QAPP to specify the file custodian for all field and laboratory records and the retention time and location for all project files.**
Response	The Navy does not intend to add the above requested information to the QAPP because the inclusion of detailed data quality management practice information would add significant volume to the QAPP without providing any additional assurances of project quality. The requested information does not include any unique project-specific procedural information. Please see response to General Comment 2.

Comment 15.	**Sections 6.1, Data Review, Page 24, and 6.2 Data Verification, Page 24: These sections of the QAPP are very general and lack much of the required information. The general information is both field and laboratory related. The field and laboratory review and verification process is absent. Furthermore, there is no information provided in this section which describes the field data review and verification requirements.** **For consistency with the Guidance, please revise the QAPP to:** **State the criteria used to review and verify field and laboratory data in an objective and consistent manner;** **Describe how field and laboratory data issues shall be resolved and the authorities for resolving such issues;** **Provide examples of field and laboratory forms and checklists to be used; and,** **Describe how reconciliation with user requirements will be documented, issues will be resolved, and how limitations on the use of the field and laboratory data will be reported to decision makers.**
Response	The Navy does not intend to add the above requested information to the QAPP because the inclusion of additional data review and data verification quality management practices would add significant volume to the QAPP without providing any additional assurances of project quality. The requested information does not include any unique project-specific procedural information. Please see response to General Comment 2.
Comment 16.	**Section 6.3, Data Validation, Page 25: The independent data validation subcontractor has not been designated. The Guidance states that critical personnel such as the data validator be identified in the QAPP. The Guidance also states that the validation forms and checklists should be included in the QAPP. For consistency with the Guidance, please revise the QAPP to provide the name of the independent data validator and provide examples of the forms and checklists that the data validator will use. In addition, revise the QAPP to state that additional data validation will be performed if errors are encountered**
Response	The Navy's contractor selects data validation subcontractors using a screening and approval process similar to that previously described for analytical laboratories. In addition, the Navy's contractor performs a technical review of all data validation performed by their subcontractors. The Navy does not intend to add the above requested information to the QAPP because the inclusion of detailed data validation practice information would add significant volume to the QAPP without providing any additional assurances of project quality. The requested information does not include any unique project-specific procedural information. Please see response to General Comment 2.

Navy Responses to EPA Comments on the
Draft Quality Assurance Project Plan
Remedial Investigation for Groundwater, SWMU Sites 2, 5, 7, and 18
Naval Weapons Station, Concord, California

Comment 17.	**Section 7.1.3, Field Audits, Page 28: This section describes field audits to be conducted during the project. However, the frequency of these audits has not been specified. Section 3.4.1 of the Guidance states "Describe each assessment to be used in the project including the frequency and type." For consistency with the Guidance, please revise the QAPP to include the frequency and type of each field audit to be conducted.**
Response	Technical systems audits of field sampling activities are performed on selected CLEAN projects at the discretion of the Navy QA Officer and contractor (Tetra Tech) QA manager. An audit schedule is maintained and is available to EPA if desired. However, at the time that the QAPP is written, it is not known whether the specific project being planned is one that will be audited.
Comment 18.	**Section 7.2.1, Field Corrective Action Procedures, Page 28: This section mentions a corrective action request form. However, an example corrective action request form has not been included in the QAPP. For consistency with the Guidance, please revise the QAPP to include an example of a corrective action request form and describe how it will be filled out, reviewed, and filed.**
Response	A copy of a corrective action request form will be included. The QAPP will be revised to incorporate a description of how the form will be filled out, reviewed, and filed.
Comment 19.	**Table 3: This table lists the reference for the analytical method to be used for this project. However, the "EPA 1999b" reference is incorrect. It appears the correct reference is "EPA 1999d". In addition, the footnote for the reference column is designated 'c'. However, there is no footnote 'c'. For consistency, please revise QAPP Table 3 to clarify these discrepancies**
Response	Table 3 will be revised as requested.
Comment 20.	**Table 4: This table lists the quantitation limits and the screening criteria for the project. However, the laboratory detection limits should also be provided to ensure that the laboratory can provide the required data to meet the specific regulatory criteria. Revise Table 4 to include the laboratory detection limits.**
Response	Because a laboratory will be identified near finalization of field schedules (so as to promote selection of contractors that can support the workload capacity), the laboratory detection limits will not be provided in the QAPP. The selected laboratory will be required to meet the Contract Laboratory Program required minimum detection limits as well as reporting limits that are equal to or less than specific regulatory criteria.
Comment 21.	**Table 4: The footnote in this table references "Region 9 Preliminary Remediation Goals (PRGs) - Second half 1995". However, the reference section specifies an October 1, 1999 PRG document. Please revise the QAPP to clarify the discrepancy. Please also note that the October 1999 is the current guidance document and all PRG values in Table 4 should correspond to the PRGs from this guidance.**
Response	The QAPP footnote and Table 4 will be revised as suggested.

Comment 22.	**Table 5: This table lists the precision and accuracy goals for volatile organic compounds. However, footnote 'a' states that laboratory-derived control limits supersede these goals. Therefore, the values placed in this table do not provide the required information. Therefore, please revise the QAPP to provide the precision and accuracy goals that the laboratory will use for the project.**
Response	The table reflects the precision and accuracy goals for the project. As described in response to General Comment 2, laboratories are not selected until the work is imminent. The purpose of this statement is to allow for the possibility that laboratory control limits may differ from the stated precision and accuracy goals.

CONCERNS FROM THE EPA'S QUALITY ASSURANCE MANAGEMENT SECTION

Concern 1.	**[QAPP: Section 2.0, Project Organization; Figure 1, Project Organization] Section 2.0 of the QAPP indicates that subcontractors will be used for the project, including the analytical laboratory. However, the QAPP does not identify these subcontractors. It is recommended that the QAPP identify the subcontractors and depict them on the organization chart.**
Response	At the time when planning documents are developed, the identity of a laboratory that can meet the capacity and demands of the project schedule are unknown. The Navy contractor has a blanket purchase agreement with several laboratories so that if a laboratory's capacity becomes impacted, and alternative lab may be utilized. The Navy and the Navy's contractor have entered into these purchasing agreements with the laboratories using a rigorous screening and selection process. The screening and selection procurement is utilized to promote consistency between laboratories and assure that high quality data will be consistently obtained. The screening and approval process includes the verification of appropriate SOPs and QA/QC practices. The screening and approval process information is available for EPA review if desired. The Navy does not intend to add the above requested information to the QAPP because laboratory subcontractor information is not available at this time.
Concern 2a.	**[QAPP: Section 3.1, Data Quality Objectives; Table 2, Data Quality Objectives Steps; FSP: Section 3.1, Overall Approach and Data Quality Objectives] The QAPP and FSP provide limited information on volatile organic compounds (VOC) analyses for soil sampling. Section 3.1.7 of the QAPP and Section 3.1 of the FSP state that the soil sampling locations and number of borings for VOC analysis will be based on the groundwater analytical results. If the subject QAPP and FSP can not identify the number and location of soil samples at this time, it is recommended that this information be provided as an addendum to these documents. However, the QAPP and FSP should specify what information will be included in the addendum, such as groundwater results from this investigation, number of soil samples and their locations, and associated quality control (QC) samples.**
Response	The QAPP will be revised to indicate that the information to be included in the addendum is described in Section 3.0 of the FSP.

Navy Responses to EPA Comments on the
Draft Quality Assurance Project Plan
Remedial Investigation for Groundwater, SWMU Sites 2, 5, 7, and 18
Naval Weapons Station, Concord, California

Concern 2b.	**Section 3.1.7 of the QAPP states that three discrete soil samples will be collected from each boring at 2, 8, and 14 feet below ground surface (bgs). However, Section 3.3 of the FSP states that a total of four discrete samples will be collected from each boring at 2, 6, 10, and 14 feet bgs. This inconsistency between the QAPP and FSP must be resolved.**
Response	The draft final QAPP and FSP will be revised to for consistency with each other and will indicate sampling will be conducted at depths of 2, 6, 10, and 14 feet.
Concern 3.	**[QAPP: Section 3.2, Analytical Methods and Reporting Limits; Table 4, Contract-Required Quantitation Limits and Screening Criteria for VOCs; FSP: Table 4-4, Volatile Organic Compounds Contract-Required Quantitation Limits] Section 3.2 of the QAPP states that low laboratory detection limits will be requested because the selected screening criteria are low. Note, Table 4 of the QAPP and Table 4-4 of the FSP indicate that the reporting limit (RL) for cis-1,3-dichloropropene is higher, 1 microgram/liter (µg/L), than the corresponding maximum contaminant level (MCL) of 0.5 µg/L. The QAPP should discuss how data will be evaluated for this compound.** **Note, Table 4 of the QAPP and Table 4-4 of the FSP also indicate that for groundwater samples the RL for many analytes are equal to the corresponding MCL. It is suggested, if possible, the RL should be lower than the MCL to ensure confidence in the data at the decision making level (MCL).**
Response	The selected laboratory will be required to meet reporting limits that are equal to or less than MCLs.
Concern 4.	**[QAPP: Section 5.1.2, Equipment Blanks; Table 7, Field Quality Control Samples; FSP: Section 6.1, Equipment Rinsate Blanks; Table 4-2, Field Quality Control Samples] Section 5.1.2 and Table 7 of the QAPP and Section 6.1 and Table 4-2 of the FSP indicate that one equipment blank per week will be collected. Region 9 requires collection of at least one equipment blank each day the equipment is decontaminated in the field.**
Response	Equipment blanks are effective tools for evaluating the effectiveness of the equipment decontamination process and have been incorporated into the Navy's environmental work within EPA Region 9 for more than 10 years. Although equipment blanks serve a valuable purpose, the Navy's decontamination procedures are well established and recent equipment blank results are rarely positive. In the Navy's opinion, the requested equipment blank frequency is excessive. Further, across the Navy's CLEAN program, the suggested equipment blank frequency would result in significant additional cost. The Navy believes that the frequency of equipment blanks should be tailored to the specific needs of each project. The Navy does not propose any revision to the QAPP in response to this comment.

Navy Responses to EPA Comments on the
Draft Quality Assurance Project Plan
Remedial Investigation for Groundwater, SWMU Sites 2, 5, 7, and 18
Naval Weapons Station, Concord, California

Concern 5a.	**[QAPP: Section 5.1.4, Field Duplicates; Table 1, Proposed Analytical Program; Table 7, Field Quality Control Samples; FSP: Section 6.4, Field Duplicates; Table 3-1, Proposed Analytical Program; Table 4-2, Field Quality Control Samples] Section 5.1.4 and Table 7 of the QAPP and Section 6.4 and Table 4-2 of the FSP state that field duplicates will be collected at a frequency of 10 percent or one sample per week, whichever is greater. However, Table 1 of the QAPP and Table 3-1 of the FSP indicate collection of only one field duplicate for 18 groundwater samples. This will result in a field duplicate frequency of 6 percent, not the required 10 percent. Region 9 requires that two field duplicates be collected for 18 groundwater samples.**
Response	Table 1 of the QAPP and Table 3-1 of the FSP will be updated to require 2 field duplicates for 18 groundwater samples.
Concern 5b.	**Section 5.1.4 of the QAPP and Section 6.4 of the FSP state that a soil duplicate sample will not be collected because of the heterogenous nature of soil. Region 9 requires the collection of field duplicates for each matrix, including soil.**
Response	True field duplicates cannot be collected for soil samples. Sampling adjacent areas only provides information on the spatial variability for the distance of separation from the sample to the duplicate. Therefore, the Navy disagrees with the implication that field duplicates for soil are useful in all cases. When soil field duplicates taken as adjacent samples show a discrepancy, sample results are not qualified (in accordance with EPA Functional Guidelines). Rather, wide discrepancies in field duplicate results are typically attributed to the heterogeneous nature of soils and the spatial separation of the duplicate, and the discrepancy is dismissed. Therefore, soil field duplicates will not be collected unless they are explicitly required to achieve project data quality objectives.
Concern 6.	**[QAPP: Section 6.4, Electronic Data Deliverables] Section 6.4 of the QAPP states that the subcontractor will use electronic storage devices that are capable of recording data for long-term, off-line storage. Raw data will be retained in such fashion as to promote future accessibility. Region 9 requires that gas chromatography/mass spectrometry (GC/MS) data on magnetic tapes should be provided to the Navy along with other laboratory data deliverables. In turn, the magnetic tapes can be made available to Region 9 upon request.**
Response	The laboratory is required to maintain raw data for a period of ten years. If required, raw data can be retrieved and reviewed by the Navy and its contractors should a question of laboratory fraud arise. Laboratory audits assure that electronic data is being stored for the specified time period and is available for retrieval.

Navy Responses to EPA Comments on the
Draft Quality Assurance Project Plan
Remedial Investigation for Groundwater, SWMU Sites 2, 5, 7, and 18
Naval Weapons Station, Concord, California

Concern 7a.	**[QAPP: Section 7.1, Performance, System, and Field Audits] Section 7.1 of the QAPP does not include a provision for analyzing double blind performance evaluation (PE) samples. Region 9 requires that double blind PE samples be analyzed for laboratory evaluation. The QAPP should specify the frequency and acceptance criteria for PE samples. In addition, the results of PE samples should be made available to Region 9.**
Response	Section 7.1 will be modified to include provisions for double blind PE samples.
Concern 7b.	**Section 7.1.1 of the QAPP states that both the Navy and Tetra Tech EM Inc. (TtEMI) will conduct laboratory performance audits before any laboratory can accept samples. It is recommended that copies of all audit reports be made available to Region 9.**
Response	The Navy will provide the EPA any audit report related to the project that is anticipated to qualify or otherwise adversely affect a laboratory test result. The QAPP will be revised as indicated in this response.
Concern 8.	**[QAPP: Table 5, Method Precision and Accuracy Goals for Volatile Organic Compounds] Table 5 of the QAPP does not specify relative percent difference (RPD) criteria for soil samples. The QAPP should specify the acceptance criteria for soil field duplicates.**
Response	The Navy does not plan to collect soil field duplicates. Please see response to Concern 5.
Concern 9.	**[QAPP: Appendix A - Chain of Custody Record] The chain of custody form should identify the environmental sample to be used for QC purposes to ensure that the laboratory will not mistakenly spike a blank.**
Response	The QAPP will be updated to note that field personnel will identify the sample to be used for QC purposes on the Chain of Custody Record.
Concern 10.	**[FSP: Section 4.3, Soil Sample Collection Procedures; Appendix B, Standard Operating Procedures - Soil Sampling SOP No. 005] Section 4.3 of the FSP states that discrete soil samples to be analyzed for VOCs will be collected using the EnCore sampler. Section 4.3 provides general information for using the EnCore sampler, but not the standard operating procedures (SOP). The provided SOP for soil sampling does not address EnCore samplers. It is recommended that step-by-step instructions for collecting soil samples using EnCore samplers or vendor's instructions be provided in Appendix B of the FSP.**
Response	Step-by-step instructions for the use of Encore samplers will be provided in Appendix B of the FSP.

Navy Responses to EPA Comments on the
Draft Quality Assurance Project Plan
Remedial Investigation for Groundwater, SWMU Sites 2, 5, 7, and 18
Naval Weapons Station, Concord, California

Concern 11a.	**[FSP: Section 4.4, Well Installation; Figure 4-1, Monitoring Well Construction Detail] Section 4.4 of the FSP provides general well specifications for the project. Figure 4-1 of the FSP provides the construction details. In addition Region 9 requires that a table identifying the well specifications (well depths, casing diameters, screen intervals) for all new wells be included in the FSP.**
Response	The FSP will be revised to add the standard well construction information that can be forecast in advance of the drilling.
Concern 11b.	**Section 4.4 describes filtration and sample collection of groundwater for dissolved metals; however, metals are not targeted for analysis. It is recommended that text not pertinent to the project be deleted from the FSP.**
Response	The text will be revised as suggested.
Concern 12.	**[FSP: Figure 2-5, Site Plan Showing Location of Proposed Geoprobe Sampling Locations at SWMU 5] Figure 2-5 of the FSP does not identify sampling location number 18. This sampling location should be depicted on the map.**
Response	The sampling location will be added.

COMMENT FROM THE EPA'S QUALITY ASSURANCE MANAGEMENT SECTION

Comment 1.	**[FSP: Section 7.2, Health and Safety] Section 7.2 of the FSP cites a basewide health and safety plan (HSP); however, the HSP is not included with or attached to the FSP. The HSP must accompany the FSP in the field.**
Response	A copy of the HSP will accompany the FSP in the Field. A copy of the HSP is also maintained in the field office.